STEEL
The Metalworking Weekly
A PENTON PUBLICATION
OCTOBER 2, 1961

Antisubmarine warfare, headed by Rear Admiral Mustin, gets new emphasis as . . .

Navy Becomes Bigger Customer 24

STEEL's Panel Of Economists — Durables to Chalk Up 11% Gain in '62 . . 21

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How Metals React in Space 58

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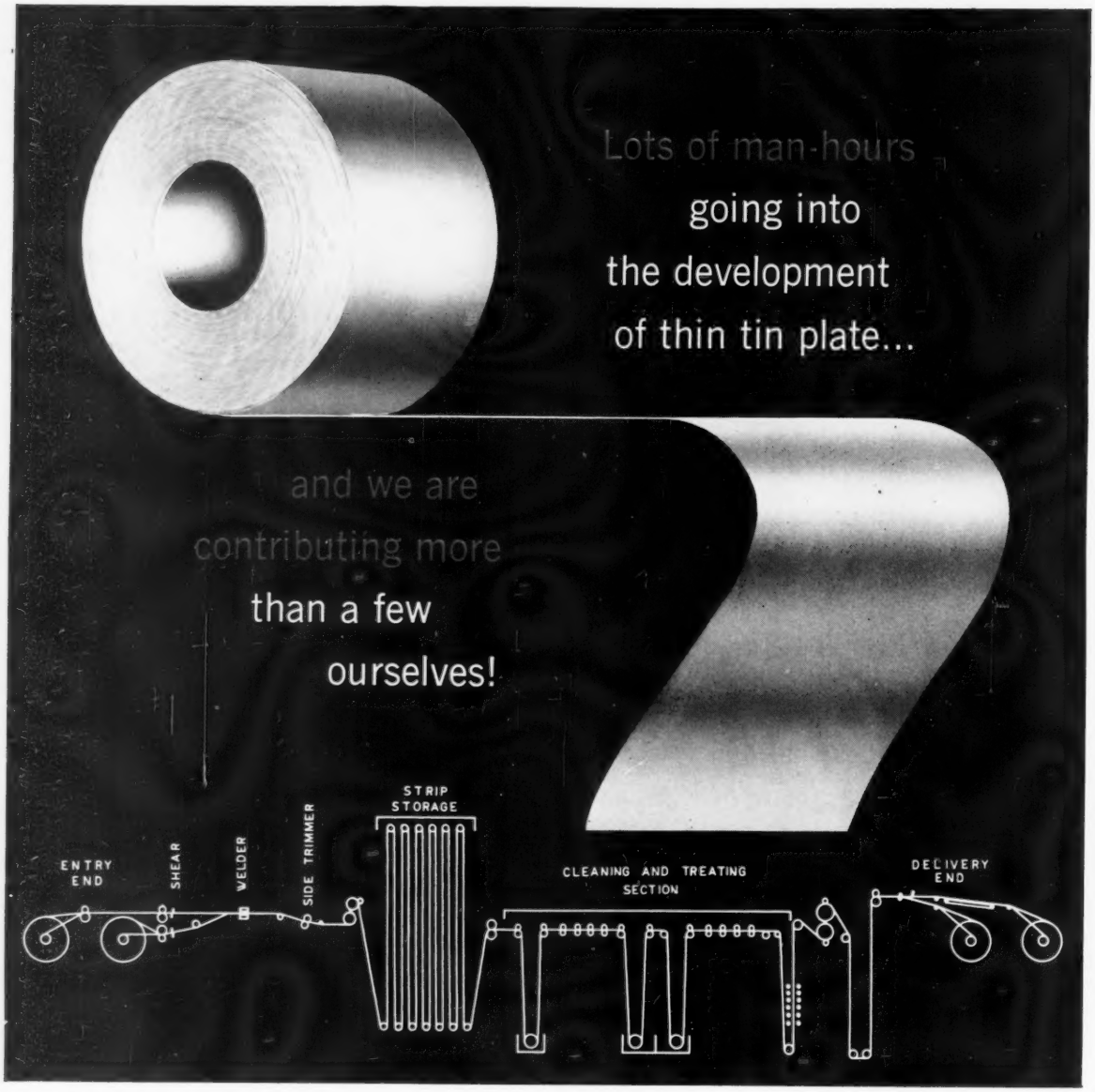

The trend toward new products, with emphasis on lightness and strength, puts the night lights back to work.

Lots of man-hours are going into these developments, such as thin tin plate and light wall pipe and tubing. We are contributing more than a few ourselves. We should. We are a major supplier of equipment, and what's good for the industries we serve is good for us.

More important, we do have a lot of knowledge and experience to draw on. We have been building equipment for handling and processing sheet and strip, as well as bars, tubes and pipe for a good many years.

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Pittsburgh 22, Pennsylvania

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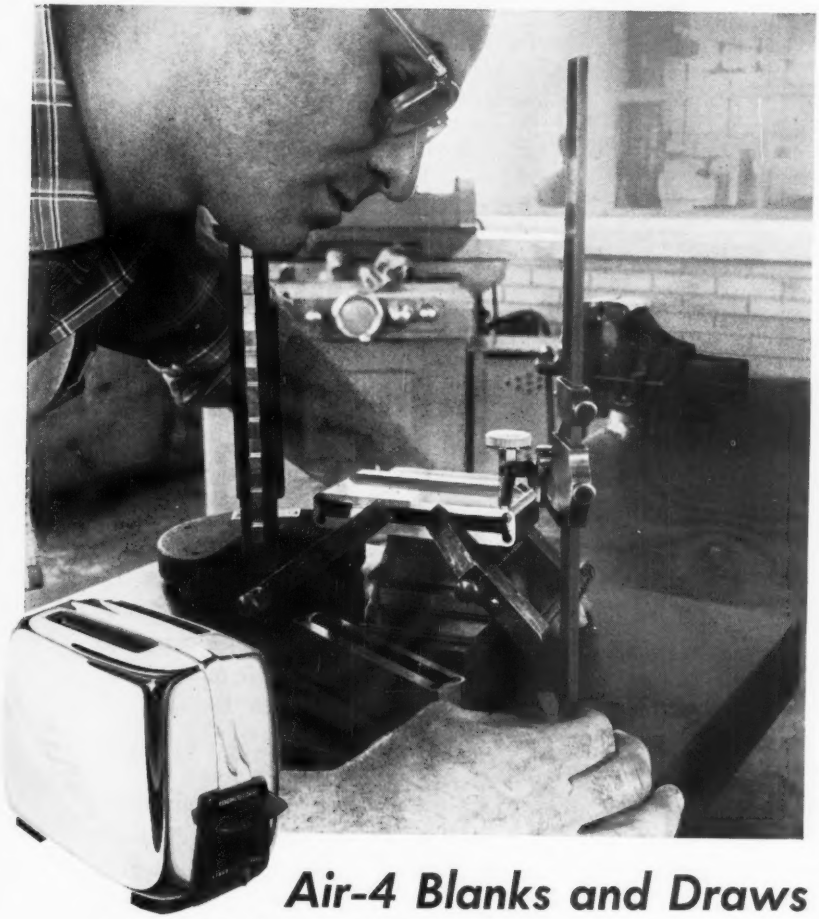
Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation



Air-4 Blanks and Draws Bread Slots in GE Toaster Shell

This blanking and drawing die, made from Bethlehem Air-4 tool steel, forms bread slots in .030-in. steel sheet for a General Electric automatic toaster. Hardened to Rockwell C 59, the die sections were made by Yarema Bros. Tool & Die Co., Allentown, Pa. They were pleased with Air-4 for two reasons—minimum distortion during heat-treatment, and easy machinability.

Hardens in Air at 1550 F

One of the big advantages of Air-4, Bethlehem's new free-machining medium-alloy tool steel, is its ability to harden in air at low temperature — about 1550 F. Air-4 has exceptional free-machining characteristics because just the right amount of lead has been added. It has high wear-resistance, excellent toughness, and deep-hardening properties — everything you need for economical tool service.

Our booklet on air-hardening steels includes full data on Air-4. For your copy, write to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. Ask for Booklet 548.

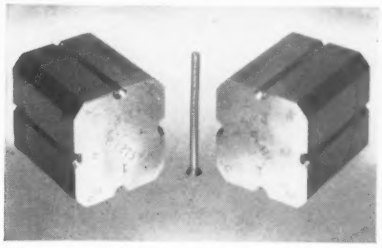
BETHLEHEM TOOL STEEL ENGINEER SAYS:

Lehigh H Is the Work-Horse Of the Cold-Extrusion Industry

Bethlehem's Lehigh H, a high-carbon, high-chromium (AISI type D-2) tool steel, is the most widely used tool steel in the cold-extrusion industry. And for good reasons. Lehigh H has an unusually good combination of properties: high compressive strength, deep hardenability, and high resistance to wear.

Lehigh H is used for a wide variety of cold-extrusion tools, such as punches and mandrels which are subject to compressive loads or abrasion. Whenever it is used for containers, bushings, or similar parts which are subjected mainly to tensile loads, it is supported by an external shrink ring.

Cold-extrusion tools of Lehigh H are usually made to a hardness of Rockwell C 58-60. Occasionally they are tempered back to C 55 to avoid breakage. Using a hardness above C 60 is not recommended, because such a hardness is obtained only at a sacrifice of proper tempering.



COLD-HEADING DIE STEEL SPEEDS HEADING OF SCREW BLANKS

These gripper dies are used by Southern Screw Company in forming blanks from steel wire. The dies, made of Bethlehem Cold-Heading Quality tool steel, produce about 150,000 blanks before redressing is required. Bethlehem Cold-Heading steel resists shock because it is carefully controlled for hardenability. It also has a carbon range selected to give good wear-resistance and high toughness.

Identify durable, modern steels in your products. Use this label.

ALUMINIZED STEEL Type 1 has been used in exhaust system parts for years. One of the newest is this spark arrester for trucks and tractors. In forest areas, it traps exhaust sparks.

Design for durability Armco Coated Steels

For strength with economy, steel is still the best answer. And special Armco Steels, with coatings of zinc or aluminum, offer unmatched selection for *low-cost durability, too.* They are designer's materials, with built-in economy.

Zinc-coated Armco Steels are produced with or without spangles. All grades can be mill-treated for immediate painting. Aluminum-coated Armco ALUMINIZED STEEL Type 1 resists a combination of heat and corrosion. Its companion, Type 2, gives products outstanding service life outdoors because of its superior atmospheric corrosion resistance.

All Offer Savings

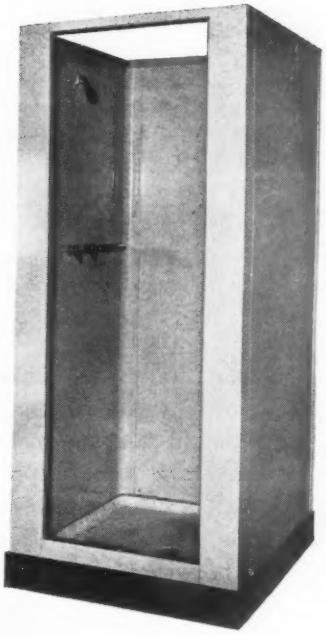
Small stampings from Armco ZINCGRIP® save 2.8 cents apiece for one manufacturer by eliminating cadmium plating. With new *spangle-free* ZINCGRIP A, PAINTGRIP®, another manufacturer achieves paint finish equivalent to that on cold-rolled steel. Besides, his product is assured of much longer paint life and over-all rust resistance.

Heater makers take advantage of the fact that Armco ALUMINIZED STEEL Type 1 outlasts all other metals in its price class when exposed to combinations of heat and corrosion. A producer of outdoor clothes dryers finds Armco ALUMINIZED STEEL Type 2 gives material savings of 30% over aluminum.

Perhaps one of these special Armco Coated Steels can help *you* design for savings, too. Mail the coupon for complete information.

ARMCO **Armco Division**

LOW-COST with



In shower stalls, new Armco ZINCGRIP A, PAINTGRIP provides special advantages. First, its spangle-free surface promotes ultra-smooth paint finish. In addition, it has full zinc protection against rust plus the sturdy strength of steel.

New steels are born at Armco

Armco ALUMINIZED STEEL Type 2 serves in the casing for this outdoor clothes dryer. The manufacturer cites strength, good looks, outstanding resistance to rust, and 30% savings over aluminum as reasons for its use.

Armco Division, Armco Steel Corporation
2091 Curtis Street, Middletown, Ohio
PLEASE SEND information on:
☐ Armco ZINCGRIP and ZINCGRIP PAINTGRIP (spangled)
☐ Armco ZINCGRIP A and ZINCGRIP A, PAINTGRIP (spangle-free)
Armco ALUMINIZED STEEL ☐ Type 1 ☐ Type 2

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Here's why STRESSPROOF *will help you get back into production faster (and minimize future breakdown possibilities):*

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- It machines faster . . . rated at 83% of B1112.
- It's strong . . . 100,000 psi.
- It wears better.
- It costs less than heat treated in-the-bar alloys . . . and you can make most of your parts from just one stock of all-purpose STRESSPROOF.

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24-Page booklet tells complete story of all-purpose STRESSPROOF

Use this coupon to request your copy of "How to make your own machine and repair parts quicker and easier." It tells how to make parts like these easier and faster: *arbors • axles • bolts • bushings • fasteners • gears • spindles • shafts • studs, etc.*

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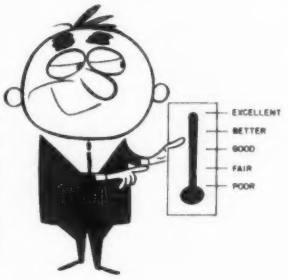
Forecast



An expert is sometimes defined as anybody who is more than a block away from his wife or two blocks away from his office. While that may be true of some people, it definitely is not true of STEEL's Panel of 53 (count them) Economic Consultants, whose fourth semiannual forecast is presented East of here on Page 21. These men are considered authorities on economic matters no matter where they are.

Organized in the spring of 1960, they cautioned metalworkers against getting their hopes too high on the Soaring Sixties. A recession followed. In the fall of last year, they predicted the bottoming out of the recession in the spring of 1961. The upturn started in April. Earlier this year (STEEL, Apr. 3, p. 41), they were among the first to recognize the upturn and correctly predicted the direction of eight of the basic economic indicators for the rest of 1961. Indications are that they hit half of the totals for this year right on the button and came within tolerable limits on the other four.

Now they are looking at the next four quarters to help you in your planning for 1962. They will tell you how high the current upturn will go, how long it will last, and what to expect afterward.

Associate Editor Bob Jaynes is the proprietor of this feature (along with The Business Trend, our quarterly surveys of metal and component stocks, plus others). He joined STEEL in 1952, after serving as editor of university publications at Bowling Green State University (Ohio) where he received his M.A. degree in 1950. His B.S. in journalism was granted by the University of Illinois.

Planning Session

We wangled an invitation the other day to an editorial session at which more than a score of editors were working on plans for 1962.

The two main items on the agenda were an impact issue for Jan. 1, 1962, and the Program for Management next year. Three teams had developed rival proposals for the impact report, and three had labored on the management series.

The three impact proposals were being considered as we slipped in. We gathered that none was completely satisfactory. A new team was going to take the best features of each to work into still another proposal.

The same procedure would be used on the management articles. We had to leave before the final prospectuses were decided upon, but we'll be reporting the last word soon.

Automation and Jobs

Incidentally, reprints of our last impact report, "Automation and Jobs," which appeared Sept. 4, have been going like hot cakes. We've received some nice letters too. One that we particularly value is from Bob Wilcox, managing editor of *Mill & Factory*: "I thought the issue was extremely well done. I very much liked what you said, and the way you said it."

W. J. S. Ellis, director of systems and procedures for Union Tank Car Co., Chicago, writes: "Your treatment of automation and its effect on labor was excellent . . . one of the most comprehensive coverages of this subject that I have found."

Bound reprints of the report on Automation and Jobs are available at $2 a single copy; prices for larger quantities can be had on request. Write Reprint Dept., STEEL, Penton Bldg., Cleveland 13, Ohio.

Take a Position

Recent ads for the Dow-Jones Instant News Service show a smiling gentleman uttering these words: "Wherever I see this news ticker, I see a broker who is on his toes with his ear to the ground."

That conjures up a vision of a security analyst like this:

He may be your broker, but he's not ours.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

1961 EDITION

Metal Selector

COMING IN

Oct. 16

STEEL

Some 2000 alloys will be listed in the most up-to-date compendium available anywhere. More than 1000 changes have been made since the 1960 edition. The biggest: The addition of a section on refractory metals and the use of the copper industry's new number system for copper alloys.

Bound reprints will be available at 50 cents a copy; prices for larger quantities may be had on request. Write Reprint Dept., STEEL, Penton Bldg., Cleveland 13, Ohio.

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...Fluid Power news

OILGEAR 40 Years of Fluid Power

Report No. 11,807 From Oilgear *Application-Engineering* Files

How OILGEAR *Any-Speed* Drive Systems on revolutionary, new, continuous pipe mill provide up to 30% over and under base lineshaft speed for each stand—controlled to ±0.1% accuracy . . . maintain constant interstand speed ratios.

USER: *Lorain (Ohio) Works, National Tube Division, United States Steel Corp.*
Machine Builder — Aetna Standard Division, Blaw-Knox Co., Pittsburgh, Pa.
Differential Drive Manufacturer — Beloit Iron Works, Beloit, Wis.

PROBLEM: To provide accurate, efficient, independent, variable speed drive and control systems between a 1000hp lineshaft drive and 14 form-weld, stretch-reduce stands, and rotary flying hot saw of a new, continuous, buttweld pipe mill designed to produce approx. 237,000 tons of 1¼" to 4" buttweld pipe annually from flash-welded, endless webs of skelp. Delivery speeds range from 700 ft/min. of 1¼" pipe to 150 ft/min. of 4" pipe.

DRIVE REQUIREMENTS: 1. "Hard", non-resilient characteristics of direct gearing — with provision for infinite, variable speed control of any or all stands from 30% under to 30% over predetermined base lineshaft speed. 2. Accurate, preset, speed ratios between stands, capable of precisely maintaining transmitted differential loads to 150 hp — without drift — regardless of load change or lineshaft speed variation. 3. Optional, remote, automatic, "preset", and remote manual control. 4. Direct-reading, constant, visual indication of torque being pulled at each stand, and speed ratios between all adjacent stands. 6. Drive a rotary, flying cut-off saw at maximum mill delivery speeds — synchronized with speed of last active mill stand. 7. Must be compact, with trouble-free dependability for continuous, heavy-duty drive service. 8. One reputable source and responsibility preferred.

OILGEAR *Application-Engineered* HYTAC* Drive System For Continuous, Buttweld Pipe Mill

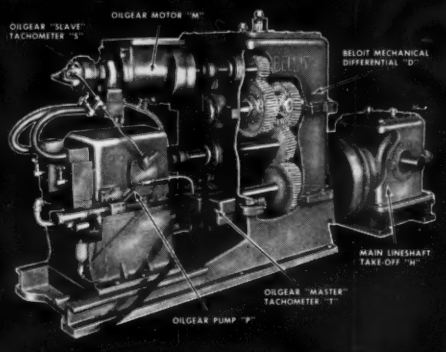
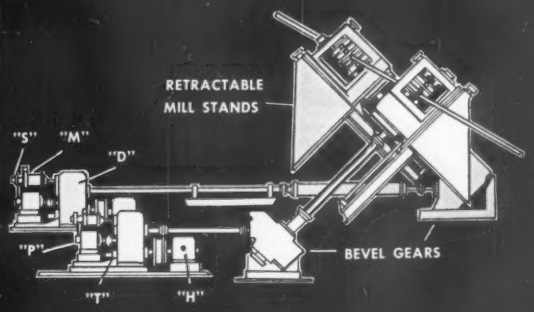


Photo Courtesy of Beloit Iron Works

LEFT: Fluid from Master Tach (T) gives stand drive speed command to control on Pump (P). Slave Tach (S) — direct-connected to Drive Motor (M)—feeds back a flow signal proportional to actual drive speed. Through remote, pushbutton control stations connected to electric pilot motor on Master Tach (T), operator can vary speed of each, or all stands infinitely up to 30% over or under base line-shaft speed . . . with accuracy to ± 0.1%. **RIGHT:** Two typical stands of seven stand stretch-reduce mill. Each stand is mounted on a steel sled—45° to horizontal—90° in relation to each other. Sled stands are movable by a hydraulic cylinder. A hydraulic clamping mechanism holds sleds in selected positions. Six pipe sizes can be rolled without changing rolls.



SOLUTION: Oilgear *Application-Engineered HYTAC** — Beloit Mechanical Differential Drives provide precise speed and ratio control for 7 form-weld stands, 7 stretch-reduce stands, and a rotary, flying cut-off saw. Overall mechanical efficiency has been determined as well above 90% at full load . . . with remotely controlled speed variable up to 30% over and under base lineshaft speed for any one or all stands — with accuracy maintained within ± 0.1%. Production speeds required for a given pipe size can be preset within a small fraction of 1% — and duplicated at any later date. In this precisely controlled process — a National Tube innovation — the buttwelded pipe is both elongated and reduced in diameter . . . *with wall thickness and pipe diameter held to extremely close tolerances by the accuracy of interstand speed ratios.* An Oilgear "Any-Speed" Drive and Control System automatically synchronizes the rotary, flying cut-off saw with maximum delivery speed of the last active stretch-reduce stand — to cut the continuous pipe in accurate, predetermined lengths.

BIBLIOGRAPHY: *Steel Magazine, Dec. 12, 1960, Page 86; Automation Magazine, May, 1961, Page 68; Steel Magazine, Jan. 30, 1961, Page 114; A paper — "Variable Speed Hydro-Mechanical Drive", by Charles W. Modersohn, Staff Engineer, Beloit Iron Works, presented at N.C.I.H., Oct. 21, 1960.* ① *See Oilgear Fluid Power NEWS 8, 11, 15, 16 — available on request.*

**HYTAC is an Oilgear Company registered trademark.*

Installation of Oilgear-Beloit Variable Speed Hydro-Mechanical Drive and Control Systems — successfully pioneered on paper machine drives ① — have exceeded originally specified requirements — without "start-up" problems . . . indicating the value of Oilgear's *Application-Engineering* teamwork throughout all stages of design, building, installation, and testing.

For accurate synchronization of multiple, tandem operations; for combining separate operations to handle webs, tows, or sheets — soft and fragile at one point, strong at another; for continuous operations where tension affects quality — or determines dimensional tolerances . . . all need MORE than conventional drives and controls — they need the precision of Oilgear "*Any-Speed*" Drives and Controls. User's state — "*For the lowest cost per year — with the most advanced, precision controls known to industry . . . it's Oilgear — the pace-setting pioneer!*"

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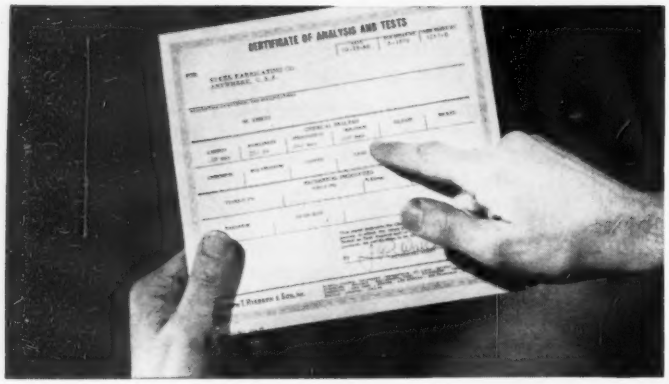
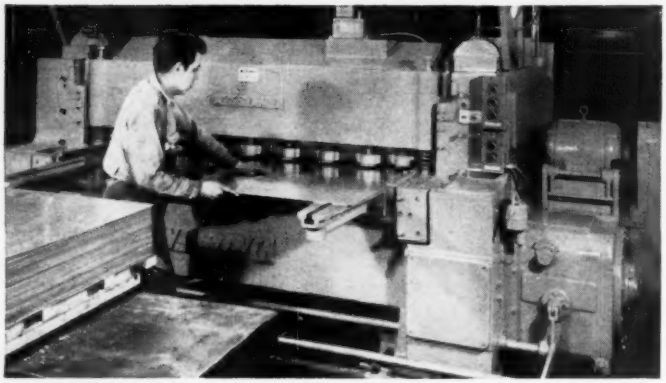
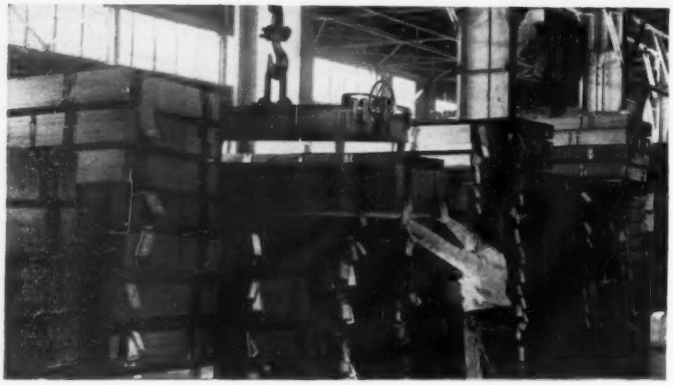
How Ryerson gives you EXTRA VALUE IN SHEET STEEL



Carbon control—Did you know that Ryerson can furnish a conformance report, if requested when your order is placed, certifying that hot or cold rolled low carbon sheets in stock sizes are SAE 1008 with maximum carbon content of .10? This means you can minimize or eliminate problems of variation in formability and weldability.

Closest cutting tolerances—Our standard "aim" tolerances are the closest in the industry. For example, on shearing of sheets: width or length tolerance—under 48", -1/32"; 48" and over, -1/16". These limits can be guaranteed upon specific request, given in advance of processing your order.





Fast, dependable service—Hundreds of customers often cite these two major reasons for ordering from Ryerson: absolute confidence in "dependability of service as promised," and speed of service to meet their most critical requirements.

Whatever your sheet and strip requirements, a Ryerson specialist is ready to consult with you. A phone call is all it takes.

RYERSON METALOGICS

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND STEEL FAMILY

STEEL · ALUMINUM · PLASTICS · METALWORKING MACHINERY

Durables to Pace Economy in 1962

Producers of durable goods are expected to increase output 11 per cent in 1962 compared with advances of 9 per cent for all production and 7 per cent for gross national product. That's what STEEL's Panel of Economic Consultants predict. The panel also sees a record pace of plant and equipment spending shaping up by the third quarter of next year. But they caution that an upturn could peak out anytime after the second quarter. How high and how far will the cycle go? See Page 21.

Structural Steel Bookings Down in August

Structural bookings by steel fabricators dipped to 384,986 tons in August, a drop of 71,000 tons from the July total, says the American Institute of Steel Construction. However, August was still the third highest month of the year to date, bringing the total for the first eight months of 1961 to 2,700,138 tons, 7 per cent above the same period of 1960.

Navy Is Becoming Bigger Customer

The Navy's budget for fiscal 1962 provides opportunities for metalworking ranging from basic research on new frontiers of technology to shipbuilding. One area receiving special attention: Antisubmarine warfare (ASW). Research and development of ASW weapons will continue at some $250 million a year. But the most pressing need is for procurement. The Navy wants more ships with advanced equipment, increased firepower, and nuclear propulsion. The story beginning on Page 24 translates these and other Navy needs into metalworking opportunities.

Aircraft Electronic Requirements to Rise Sharply

Army modernization will boost expenditures for electronics from 5 to 10 per cent of the fly-away cost of aircraft by 1970, says L. G. Regan, defense requirements specialist, Douglas Aircraft Co. In some aircraft, 30 per cent of the cost will be represented by electronics. Mr. Regan predicts the Army aircraft electronics market will grow to $530 million by 1970.

World Industrialization Creates Markets for U. S.

The Commerce Department says Japan's expanding industrialization is providing an important market for U. S. manufacturers of scientific and industrial instruments. Last year's exports to Japan advanced to $18.1 million. . . M. Krafchick, vice president, Morrison Steel Export Corp., claims industrialization among Asian countries has pushed the demand for steel and

aluminum near an all-time high. . . Economic expansion in the Common Market will help Michigan expand its $1.5 billion annual exports, but some companies will be hurt, says the University of Michigan Bureau of Business Research.

Ranger Will Reveal Moon's Secrets

Next year, a U. S. rocket will soar 250,000 miles to deliver a capsule on the moon's surface. A model of the Ranger space craft with its payload is studied by Dr. D. B. Duncan, general operations manager, Space Systems Operations, Aeronutronic Div., Ford Motor Co., and J. D. Burke, Ranger project manager, Jet Propulsion Laboratory, NASA. The 25 in. diameter sphere will collect and transmit vital data back to earth for several months.

Computer Simplifies Numerical Control Programing

Using a computer, Sundstrand Corp. has simplified numerical control programing and slashed the time involved. On one part, for example, computer calculations reduced programing from three weeks to 35 hours. The story on Page 55 tells how the computer translates numerical control data into machine instructions.

Plasma Engine Opens New Space Horizons

Satellites and deep space probes may some day be propelled by this lightweight, plasma engine developed by Republic Aviation Corp. It is powered by batteries and solar cells. Readily available inert gases, such as nitrogen, are accelerated by magnetic pinching to exhaust velocity of 100,000 mph. The plasma engine will operate without service indefinitely, making it particularly well suited for controlling satellites in orbit and for steering space vehicles, claims Republic. The engine also has fuel capacity for interplanetary flights. Republic predicts it will have a "flyable" model early next year.

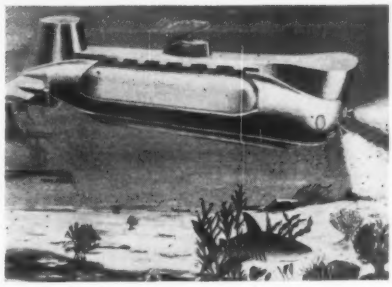
Free Use of Government Inventions Suggested

The National Aeronautics & Space Administration's proposal to grant exclusive licenses is intended to encourage industrial use of its patents. But Elmer J. Gorn, chairman, Electronic Industries Association, claims: "Government ownership of any patent destroys incentive." Exclusive licenses would present a number of risks to the holders. Mr. Gorn recommends granting the right to use government owned patents "freely, unconditionally, and without charge."

Consumer Price Index Dips

The Labor Department's index of consumer prices dropped 0.1 per cent in August to 128 per cent of the 1947-49 level. Main reason: Seasonally lower food prices. The Department notes a gain in used car prices at a time when model closeouts are normally a depressant. The outlook: Seasonal gains in clothing and used cars will cause slight advances in the index during September and October.

Three Man Aluminum Sub to Explore Watery Frontier



This $2 million aluminum submarine will be used to explore the ocean bottom. It will cruise at 3.8 knots to depths of 3 miles, far beyond limits of present subs. General Dynamics' Electric Boat Div. is building it for Reynolds International Inc. It will displace 150,000 lb. Launching is scheduled in 1963. Capt. H. E. Ruble, Office of Naval Research, reports the Navy's interested in the sub's "detection and attack" capabilities.

Metalworkers Among Hardest Hit by Foreign Competition

On studying 192 representative commodities manufactured in the U. S. and abroad, Booz, Allen & Hamilton finds that foreign producers have an overall production cost advantage in 44 per cent of the cases, while U. S. firms have an edge in 37 per cent. Foreign producers of fabricated metals and machinery have a distinct cost advantage in almost two-thirds of their field.

Gas Appliance Sales Behind 1960 Pace

During the first eight months of this year, gas appliance sales ran behind the 1960 pace. Figures from the Gas Appliance Manufacturers Association Inc. show how gas appliances fared:

	Unit Sales, January-August		
	1961	1960	% Change
Central Heating Equipment	726,918	727,062	−0.02
Domestic Gas Ranges	1,152,400	1,204,500	−4.3
Water Heaters	1,741,000	1,888,800	−7.8
Wall Heaters	202,800	222,500	−8.9
Floor Furnaces	40,800	47,800	−14.6
Direct Heating Equipment	576,600	715,900	−19.5
Unit Heaters & Duct Furnaces	92,800	96,400	−3.7
Automatic Incinerators	25,000	29,000	−13.8

New Trends in Personnel Management Cited

Fast breaking technological advances and rapid shifts in economic patterns demand new thinking and planning by personnel managers, experts declared last week at American Management Association's fall personnel conference in New York. New approaches are needed to develop more versatile employees and to upgrade the workforce, they said. These future trends were noted: In management compensation—stock option plans will decline; incentive plans

STEEL The Metalworking Weekly

October 2, 1961 Vol. 149 No. 14

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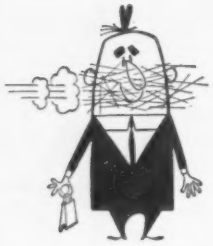
29 W. 39th St., New York 18, N. Y.

and bonuses will be limited to those who show improved performance. In labor relations—the Kennedy administration will continue to use "early, personal" participation to resolve labor-management disputes, particularly in defense industries.

Pittsburgh Auditorium Features Stainless Steel Dome

At the press of a button, six, 300 ton leaves of this stainless steel sheathed dome roll shut, converting the Pittsburgh Public Auditorium from an open air stadium to a weatherproof enclosure in 2½ minutes. Dimensions: 415 ft in diameter, 136 ft high.

Straws in the Wind



Vinco, a French manufacturer, has selected Buffalo as a site for making its office furniture . . . More than 1 million students are receiving televised instruction emanating from an airplane at 23,000 ft over central Indiana . . . The University of Michigan is beginning a two year research project to develop and test preretirement programs for hourly rated workers . . . With 13 recent additions, the number of small business investment companies licensed by the Small Business Administration advanced to 366 . . . Jones & Laughlin Steel Corp. has let a contract to Koppers Co. Inc. to build a new blast furnace at J&L's Cleveland Works . . . Alcoa will unveil a new hopper car this week, built by Pullman Standard for the Louisville & Nashville Railroad . . . Packaging Machinery Manufacturers Institute members report 1961 equipment sales will top last year's by 20 per cent.

Metalworking Pulse

The Business Trend: Look for STEEL's industrial production index to pass the high point for 1961 in the next few weeks. It probably will surpass the all-time peak, set in the week ended Jan. 24, 1960, before yearend. **Autos:** With the GM strike settled, a gradual return to normal output is expected, barring a major strike against another major producer. **Steel:** Ingot production is the highest it has been since the week ended May 7, 1960.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49 = 100)
  Week ended Sept. 23 . . . **168†**
  Year ago **151**
  Details on Page 41
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Sept. 30 **100,000***
  Year ago **134,118**
  Details on Page 38
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Sept. 30 **2,120,000***
  Week ago **2,114,000**
  Details on Page 82

†Preliminary. *Estimated.

This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

Are You Getting What You Pay For?

When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact... the qualities that they *pay* for — they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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Roebling... Your Product is Better for it

COSTS CUT 60% WITH NELSON® STUD WELDING

Drilling and throughbolting out! Nelson Stud Welding in! The transition was almost that fast when this Minneapolis manufacturer was shown he could save 60% in the fastening of cover plates to commercial dry cleaning equipment.

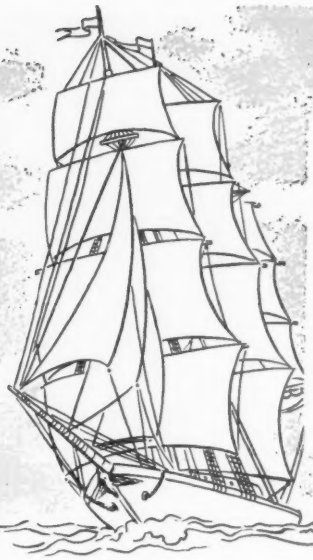
Nelson Stud Welding is a fast method of end-welding studs to steel or aluminum. In a split-second, with a squeeze of the trigger, a rugged, secure stud attachment is made. The ease and speed of stud welding lowers fastening costs, increases production. You get lower product weight (no heavy bosses needed), no possibility of leaks in water or oil-tight units, less material handling (the tool goes to the work) and greater design flexibility.

Application ideas, design recommendations and full method information is in the Nelson "Design Manual". Send for a copy today. **NELSON STUD WELDING,** Div. of Gregory Industries, Inc., Dept. S, Lorain, Ohio.

GREGORY INDUSTRIES

Why Rust-Oleum is different—

and what this difference, backed by 35 years of industry proof, means to you!



A Sea Captain developed it . . . Industry proved it!

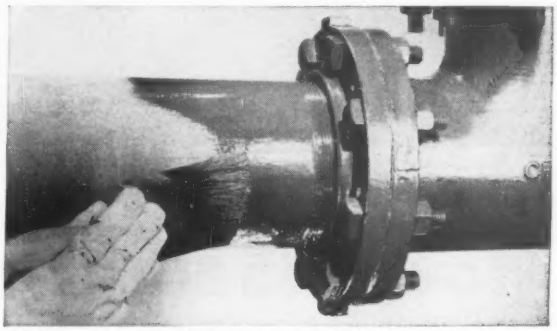
The original Rust-Oleum formula was developed nearly fifty years ago by Sea Captain Robert Fergusson, who became intrigued with the rust-stopping qualities of fish oil early in his career. Creating a *special treatment* for the fish oil, he used the *specially-processed fish oil* as the vehicle in combination with fine rust-inhibiting pigments. The result? A coating that actually *stopped rust* when applied directly over sound rusted surfaces, after scraping and wirebrushing to remove rust scale and loose rust. Possible, because the *specially-processed* fish oil penetrated the rust to bare metal. This was the birth of Rust-Oleum's *exclusive* 769 Damp-Proof Red Primer.

PROVED THROUGHOUT INDUSTRY FOR OVER 35 YEARS

Today, Rust-Oleum in its many systems and colors, has been proved throughout industry for over thirty-five years. This proof by leading industrial users is your assurance of savings in time, money, and metal. Economies made possible by the fact that Rust-Oleum 769 Damp-Proof Red Primer goes right over the sound rusted metal—usually eliminating costly surface preparations. And Rust-Oleum, in its various systems, resists rain, sun, fumes, heat, weathering, chemicals, etc., for lasting beauty over the years.

RUST-OLEUM NEW COLOR HORIZONS SYSTEM

The Rust-Oleum New Color Horizons System introduces a new coating concept to industry. It combines four important factors: (1) the ability to stop rust, (2) smart, modern color harmony, (3) the durability to last and last, (4) ease of application that saves time, money, and metal. See how this system can bring lasting beauty to your plant, machinery, equipment, pipes, tanks, structural steel, fences, etc. Write for complete information or contact your nearby Rust-Oleum Industrial Distributor. He maintains complete stocks for prompt service.



RUST-OLEUM®

There are imitations, but only *one* Rust-Oleum. It is distinctive as your own fingerprint.

STOPS RUST!®

ATTACH TO YOUR LETTERHEAD

Rust-Oleum Corporation
2599 Oakton St., Evanston, Illinois

Please send me the following at no cost or obligation:

- ☐ New Color Horizons Systems Catalog featuring 110 actual color standards and 69 photo applications.
- ☐ Free test sample of Rust-Oleum 769 Damp-Proof Red Primer to be applied over sound rusted surface.
- ☐ Results of radioactive tracing study on Rust-Oleum fish oil penetration.

In test flight, the X-15, America's first manned space probe ship, has reached a speed of 3370 mph, and an altitude of 169,600 ft. Ship was built by North American Aviation, Inc.

How X-15 survives red-hot re-entry

When the latest pilot-controlled research rocket plane, **X-15**, streaks in from space to re-enter the earth's atmosphere, air friction heats its nose and leading edges to a blood red heat in seconds.

"Blood red heat" temperatures might easily weaken the skin of the **X-15**... hopelessly soften, deform or destroy many other materials.

How could designers make it possible for X-15 and her pilot to return safely?

The answer was found in an age-hardenable nickel-chromium alloy. Developed by Inco research, it successfully withstands the destructive effect of intense heat. Even when red hot, it retains the strength which the **X-15** needs to safely make its re-entry into the atmosphere.

High temperature properties, corrosion resistance, strength, elasticity, beauty... so many varied advantages can be achieved through the use of Nickel in metals.

If your business is metals, or if you use metals in your business, call on Inco for the latest information about how Nickel and its alloys can help you. *The International Nickel Company, Inc., 67 Wall Street, New York 5, N. Y.*

Inco Nickel

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Your Opportunities Abroad

ROME—Our current European travels (largely on behalf of Penton's new publication, STEEL INTERNATIONAL) provide convincing proof that U. S. industry needs to take a fresh look at business opportunities in revitalized Europe.

For centuries, Europe was hamstrung by its division into many political and economic units.

Now the barriers are being rapidly swept aside. In the first step, France, Germany, Italy, The Netherlands, Belgium, and Luxembourg formed the European Coal & Steel Community in 1952 to set up a single market for steel.

The second step came along in 1958, with the formation of the European Economic Community. As the third step, the EEC is emerging as a United States of Europe. It is working toward a common foreign policy and common currency and political goals.

As part of its plan, the EEC cut internal tariffs 20 per cent on two occasions, and it contemplates another 20 per cent on Jan. 1, 1962. External tariffs, already partially revamped, will be made uniform.

EEC progress can be measured by its industrial production index. It rose from 100 in 1958, to 107 in 1959, and to 121 in 1960. It will top 130 in 1961.

EEC progress can be visibly measured by widespread construction of housing, superhighways, subways, pipelines, powerplants, and factories needed to serve a population that will grow from 168 million in 1960 to 181 million in 1970.

Despite such growing self-sufficiency, the U. S. isn't being frozen out of the European market. U. S. knowhow and products are highly respected.

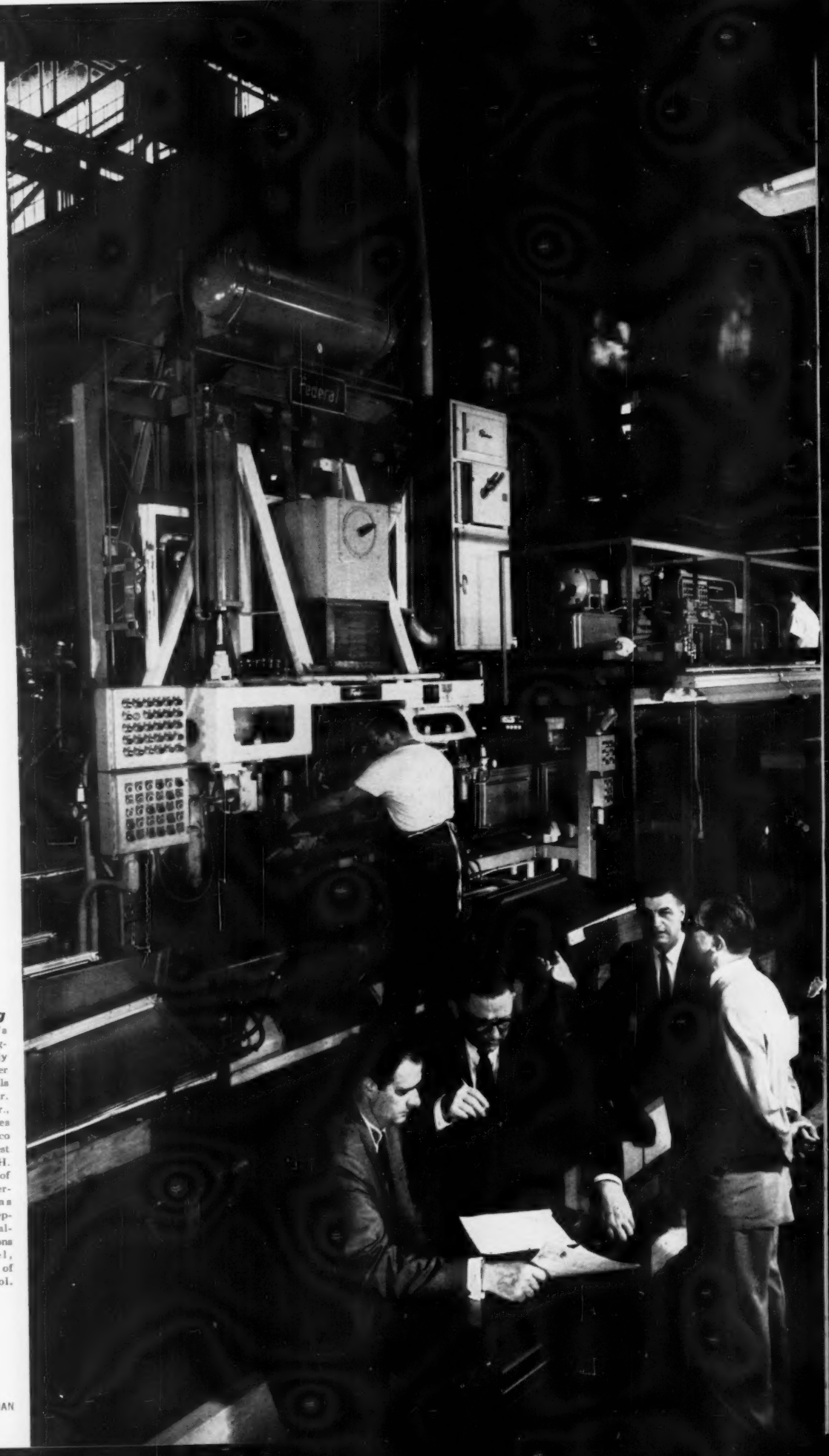
Many U. S. companies are setting up tax-haven holding companies which, in turn, establish manufacturing plants—usually with local partners. U. S. Steel, the latest addition to a list of 1000 companies with foreign affiliations, signed with Terni on Sept. 19 to build a steel plant in Italy.

Other companies have their products made under license. Often, some parts are shipped from the U. S. Others sell products direct—they are of advanced design, are unavailable elsewhere, or can be sold at low prices.

Whatever the approach, the effort is paying off for many companies. However, if you decide to tackle the European market (and we think you should), don't plunge. Study all the angles first. The pitfalls are many, but the rewards can be great!

Irwin H. Such

VICE PRESIDENT-EDITORIAL

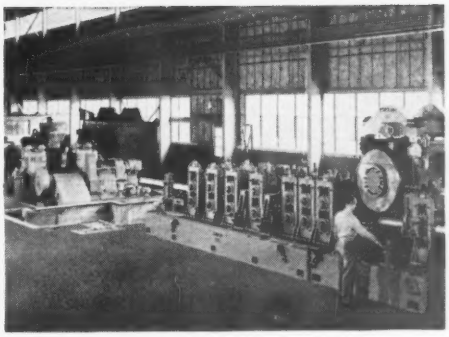


Federal Welding Line at Whirlpool's Evansville, Indiana, refrigerator plant automatically forms and welds together complete food liner shells at a rate of 200 per hour. Here, F. A. Bodenheim, Jr., manager of welder sales for McKay's Federal-Warco Division, goes over latest production charts with H. J. Muehlbauer, director of manufacturing engineering for Whirlpool, as Robert Bussell, sales representative for Federal-Warco, discusses operations with Gene Rommel, general superintendent of tooling for Whirlpool.

Photo by ARNOLD NEWMAN

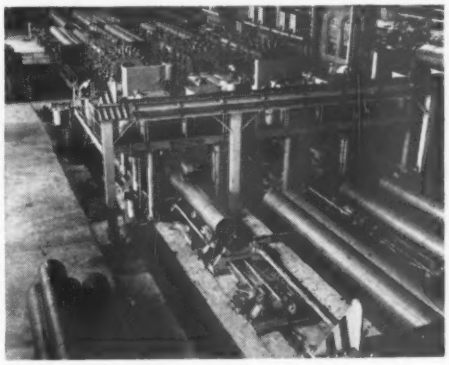
A completely integrated plant . . . a single source of supply . . . one area of responsibility! A new idea? Not really, but an idea that's not easy to bring to reality. McKay Machine has done it for metal fabricators, designing and building equipment to volume produce parts or entire units from raw steel to finished product. ***This is McKay Machine*** We know steel handling . . . we've been designing uncoilers and coil-handling equipment for 30 years. McKay Machine knows welding because the highly respected names of Federal Welder and Berkeley-Davis are now a part of our company. We know processing and forming . . . McKay levelers, tube mills, and cold roll forming machines have been specified by leading industrial firms for more than two decades. And McKay Machine knows stamping, as the Warco Press name testifies. McKay builds the industry's most popular shearing and slitting equipment. Only McKay Machine designs and builds all the components for a truly integrated production line. If you are one of the hundreds of manufacturers who must shave production and handling costs to successfully compete, McKay Machine should interest you. If we do, let us know and we'll meet with you at your convenience. *The McKay Machine Company, Youngstown 1, Ohio.*

McKAY MACHINE



McKay Tube Mills and roll forming machines are considered among the best engineered in the world.

Warco Presses can be found in the leading automotive, appliance and aircraft plants . . . wherever stamping is a major operation.



Berkeley-Davis Fusion Welding Lines, such as the huge installation above, are used by an ever-increasing number of leading steel fabricators.

. . . select the type and size of steel you require . . . any amount, in any variety . . . and your ***Steel Service Center*** can provide it, one—two—three! ■ A phone call is all it takes to get Steel Products Delivery . . . fast . . . and dependably! ■ For example, your nearby ***Steel Service Center*** is ready to take care of your needs for such Inland Steel products as Ti-Co® galvanized sheets or coils, Ledloy® leaded steels, 4-Way® Safety Plate, bars, flat-rolled and structural steels. ■ Wide selection and speedy delivery are but two of the many advantages offered by your ***Steel Service Center.*** It will pay you to get *all* the facts. Why not call today.

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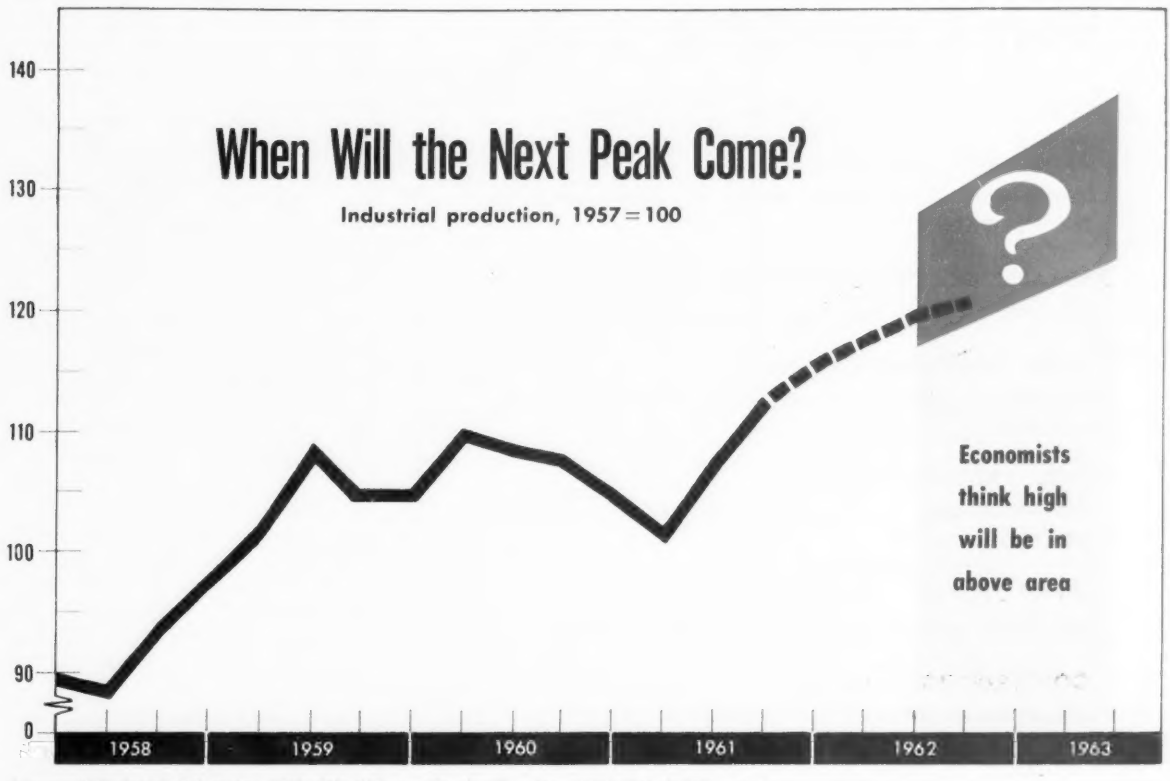


Sources: 1958 through 3rd quarter, 1961, Federal Reserve Board; 4th quarter, 1962, through 3rd quarter, 1963, estimated by STEEL's Panel of Economic Consultants.

STEEL's Panel of Economic Consultants predicts . . .

Durables to Pace Economy in '62

DURABLE GOODS production will pick up speed and lead the national economy to new highs in 1962. It's possible that the prosperity will continue well into 1963.

That's what STEEL's Panel of Economic Consultants forecasts in our fourth semiannual survey. They have one reservation: While they see record levels for practically all major segments of the economy in 1962, they express concern over the duration as well as the magnitude of the upturn (see chart).

• **Strength in Hard Goods**—For the most part, the consultants see a substantial growth period ahead—but one almost completely lacking in boom characteristics. Significantly for metalworkers, they predict an 11 per cent gain in durable goods next year, a greater increase than in either total production or gross national product.

The FRB index of total production will gain about 2 points a quarter through the first half of 1962, then begin to level off at about 1 point a quarter. Durable goods will gain 3 points a quarter, leveling off to a 1 point gain four quarters from now. The force behind this upward drive will come from steel production (60 million tons in the first six months of 1962), autos (3.6 million units in the first half), and plant and equipment expenditures (annual rates of $36.7 billion and $37.5 billion in the first and second quarters of next year.)

Gross national product will hit an annual rate of $535 billion in the current quarter, the panel believes, then will gain about $10 billion a quarter through the third period of next year.

• **How '62 Looks**—Comparing 1962 predictions with the anticipated 1961 results, the economists see these gains (median estimate of all respondents):

Gross national product—up 7.3 per cent.

Total industrial production—up 9.1 per cent.

Durable goods production—up 11.5 per cent.

Plant and equipment spending—

Where Economy Will Be in 1962

As Seen by STEEL's Panel of Economic Consultants

GROSS NATIONAL PRODUCT
$564 billion annual rate in 3rd qtr vs. $516.1 billion in 2nd qtr, 1961.

DURABLE GOODS PRODUCTION
118 (1957=100) in 3rd qtr vs. 108 in August, 1961.

PLANT, EQUIPMENT SPENDING
$38 billion annual rate in 3rd qtr vs. $33.5 billion in 2nd qtr, 1961.

STEEL PRODUCTION
115 million ingot tons vs. estimated 100 million tons in 1961.

AUTO OUTPUT
6.5 million units vs. estimated 5.5 million in 1961.

CONSTRUCTION ACTIVITY
$60 billion vs. estimated $57.6 billion in 1961.

HOUSING STARTS
1.4 million units vs. 1.3 million in 1961.

Projections represent median estimates of panel.

up 9 per cent.

Steel ingot production—up 15 per cent.

Auto output—up 18.2 per cent.

New construction put in place—up 4.2 per cent.

Housing starts—up 7.7 per cent.

All but steel production, auto output, and housing starts are expected to post records next year.

• **How Far?**—Many panelists claim that patterns of previous business cycles and forces clearly at work today establish a framework for the next peak. But some say trying to pinpoint the next turn is guesswork—although educated guesswork. Such guesswork helped the panel to correctly call the upturn last spring. (See STEEL, Apr. 3, pp. 41-42.)

About half of the group says production will reach its peak during the second quarter of next year, which would make it a relatively short cycle. The chief argument is that inventory accumulation will reach its height just before the steel industry negotiates a new labor contract. Then, strike or no strike, there will be a shaking out which will put a damper on further economic expansion.

The other half claims that the economy will keep right on climbing at least until the second half of 1963. (Only one panelist says the peak could come in 1964.) The main claims of this group are: Political action to keep the upturn going; continued high defense spending; and rising consumer spending.

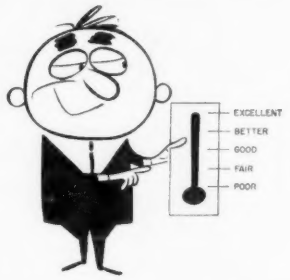
• **Each One Unique**—But as John J. Balles, vice president and economist of Pittsburgh's Mellon National Bank, points out: "Each cycle is largely unique, and the conditions that will affect the present upturn lie largely in decisions yet to be made by consumers and by policymakers in businesss, labor, and government. Based on experience, an upturn lasting at least two years would be a reasonable expectation. It could last longer—especially if cost-push inflationary pressures were terminated; if government started to encourage rather than harass business; and if badly needed tax reform were forthcoming."

• **How High?** — The most often mentioned peak for the cycle is 125 on the Federal Reserve Board's industrial production index (1957=100). But one economist cautions it could come at a comparatively low 117, while another says it could come late in 1963 at a level of about 138. Few think that the gross national product will go beyond the $600 billion mark in this business cycle. Most say the GNP will peak some time after the production index has leveled off or started down.

A few of the consultants are chary about the current upturn. Norman Robertson, manager of economic studies at American Radiator & Standard Sanitary Corp., sums it up this way: "Although there is no doubt that a moderate economic recovery is underway, I can find little evidence of a business boom at the present time. There are some real questions regarding the durability of the current business upswing, particularly in view of the cautious pattern of consumer spending, the failure of installment debt to continue upward, the lack of any real buoyancy in the new house market, and the continued downtrend of commercial and industrial building awards."

Another panelist comments: "The possibility of a slight business decline cannot be ignored. If this occurs, it will begin during the final quarter of 1961 and linger briefly as 1962 begins. However, any downturn will be mild and brief because government spending will accelerate the business recovery and lead to a higher level of production, employment, and income."

• **Agree on Mildness** — Regardless of the timing of the turn, there is almost complete agreement that the next recession will be mild compared



STEEL's Panel of 53 Economic Consultants

A. G. Abramson, director of economic planning, SKF Industries Inc.
John T. Anderson, manager, Commercial Research Dept., Armco Steel Corp.
Miner H. Baker, vice president & economist, Seattle-First National Bank.
John J. Balles, vice president & economist, Mellon National Bank & Trust Co., Pittsburgh.
Charles J. Berthy, manager, market planning, Ledex Inc.
William F. Butler, vice president, Chase Manhattan Bank, New York.
William P. Carlin, director of economics, Republic Steel Corp.
Fred Carlson, director of business research, Dresser Industries Inc.
George W. Coleman, economist, Mercantile Trust Co., St. Louis.
F. George Couvares, director of market research, American Institute of Steel Construction Inc.
Edward L. Cushman, vice president, American Motors Corp.
James M. Dawson, vice president & economist, National City Bank of Cleveland.
Robert J. Eggert, market research manager, Ford Motor Co.
David C. Elliot, vice president, Cleveland Trust Co.
Ira T. Ellis, economist, E. I. du Pont de Nemours & Co. Inc.
Richard W. Everett, assistant manager, sales control, Continental Can Co. Inc.
W. H. Finigan, director, marketing research, National Cash Register Co.
A. C. Fischer, regional market planning manager, Westinghouse Electric Corp.
William C. Flaherty, director, business research & market planning, Chrysler Corp.
Curry W. Gillmore, director of statistics & economics, International Business Machines Corp.
Lee S. Gunlogson, director of market research, Carrier Corp.
Borden Helmer, economist, Union Carbide Corp.
Joseph K. Heyman, senior vice president, Trust Co. of Georgia, Atlanta.
William Dudley James, product manager, Ophthalmic Div., Bausch & Lomb Inc.
C. C. Jamison, vice president & manager, Research Dept., Security First National Bank, Los Angeles.
Norris O. Johnson, vice president, First National City Bank of New York.
Lester S. Kellogg, director of economic research, Deere & Co.
Edmund R. King, assistant treasurer & chief statistician, Eastman Kodak Co.
B. J. Korb, manager, market & economic research, Koppers Co. Inc.
Herbert A. Leggett, vice president & economist, Valley National Bank, Phoenix, Ariz.
Harry Leopold Jr., director of commercial research, John A. Roebling's Sons Div., Colorado Fuel & Iron Corp.
Irving Lipkowitz, director of economic affairs, Reynolds Metals Co.
C. W. Mackay, manager, Business Research Dept., Anaconda Co.
Stanley V. Malcuit, staff economist, Aluminum Co. of America.
Noel McBride, senior economist, Federal Reserve Bank of Cleveland.
H. L. Micoleau, economist, financial staff, General Motors Corp.
Robert A. Pitcairn, manager of market research, Crucible Steel Co. of America.
James L. Rich, assistant director of commercial research, U. S. Steel Corp.
Charles S. Ricker, assistant vice president, National Bank of Detroit.
W. R. Riggs, manager, Commercial Research Dept., Kaiser Steel Corp.
Norman Robertson, manager of economic studies, American Radiator & Standard Sanitary Corp.
Nathaniel H. Rogg, director, economics & policy planning, National Association of Home Builders.
Arthur Rosenbaum, manager-economic research, Sears, Roebuck & Co.
W. E. Rothfelder, manager, Commercial Research Div., Inland Steel Co.
Arthur A. Smith, vice president & economist, First National Bank, Dallas.
A. Howard Smith, manager, Commercial Research Dept., Jeffrey Mfg. Co.
Beryl W. Sprinkel, economist, Harris Trust & Savings Bank, Chicago.
Benjamin F. Stacey, vice president, First National Bank of Boston.
Wm. W. B. Upton, assistant trust officer, Philadelphia National Bank.
Murray L. Weidenbaum, economist, Boeing Co.
David L. Williams, economist, Cleveland Twist Drill Co.
Roger Williams, manager of business research, Luria Bros. & Co. Inc.
Raymond E. Zelder, chief, business conditions & forecasting, Bank of America.

with its predecessors. Most estimates are in the range of 8 to 10 per cent from the peak.

In summing up his outlook, Edward L. Cushman, vice president of American Motors Corp., seems to echo the feelings of his fellow panel members when he says: "Policies of restraint on the part of government, unions, businessmen, and consumers will provide a basis for sustained growth. Whether we can achieve this objective is, in my opinion, still conjectural. To the extent that we are successful, the recovery will be prolonged."

What 'Outsiders' Predict for Steel

THE LONG TERM outlook for the steel industry is good. Despite the problems presented by imports and competition with other materials, the industry will win new markets, sharply increase efficiency, and achieve a better production-consumption balance.

That is what the New York Society of Security Analysts Inc. was told last week by three veteran steeel industry observers.

The tremendous buildup in steel capacity outside the U. S. poses a problem to domestic producers, believes the Rev. W. T. Hogan, S. J., director of economics, Fordham University. Within five years, estimates Father Hogan, world capacity will grow 200 million tons to 580 million tons. Examples: Italy will increase its capacity from 9 million to 14 million tons, India will double its present 6.6 million ton capacity, and Japan will increase its capacity from 24 million to 42 million tons.

• **When We'll Be Hit**—Expansion overseas is designed to take care of home markets. But, from time to time, when business is slack in Europe and Asia, steel made there will find its way to the U. S. "Our problem," says Father Hogan, "won't be heavy imports every year (except in certain product lines like wire, pipe, reinforcing bars) but those periods when overseas business is down when we'll be hit hard by imports."

Much of our steel export market has come as a result of the U. S. foreign aid program. As foreign producers put in specialized steel production facilities, some of our present export markets may dry up, says Frank McCarthy of Adams Express Co.

• **Better Balance** — The next few years look good for steel, believes Alfred S. Rudd of Hornblower & Weeks. His views: Production, shipments, and consumption will probably be in much better balance. "Since 1957, we have consumed about 20 million more tons of steel than we have produced or imported. Today, inventories are closely in balance with needs."

OPPORTUNITIES
IN DEFENSE No. 3

Navy's Becoming Bigger Customer

SATELLITES to submarines — that's the Navy's product range. Opportunities for metalworking in the service's fiscal 1962 budget (see table) range from researching new frontiers of technology to shipbuilding, and the budget trend is upward. The Navy is proceeding with its 29 ship, Polaris fleet, increasing its work on the problems of antisubmarine warfare (ASW), and is developing its own space program.

• **Concentration** — The budget is heavy in two areas: The Polaris takes $2.1 billion, including the submarines, the missiles, and the support equipment; ASW takes $1.8 billion, including ships, aircraft, and research. Polaris spending may fall as development of the A-2 and A-3 versions of the missile is completed, permitting a shift to more ASW spending.

• **Polaris**—The Polaris budget for this year includes $1.1 billion for submarines, $316 million for missiles, $160 million for other equipment, $443 million for research on advanced missiles and improvement of the whole weapon system, and $47 million for operation and maintenance.

Polaris submarines cost about $110 million, without missiles. Five are on station now and others are being built; the 29th will be commissioned in fiscal 1964. A new class was started last year, and older ones will have to be overhauled to fire advanced versions of the Polaris. The A-2, a 1500 nautical mile missile, will be operational next spring; the A-3, with a 2500 mile range, will be ready by mid-1964; and an even longer range bird is under consideration.

• **ASW Procurement**—Rear Adm. Lloyd Mustin, ASW readiness executive to the chief of Naval operations, runs a department which considers ASW problems, including research, procurement, and operations throughout the Navy. He says research on ASW products has kept us ahead of other nations in submarine defense for several years.

But the admiral warns: "The Navy's . . . most pressing problems in ASW are not in the realm of research and development . . . they are in the realm of procurement. Excellent products of R&D are available . . . What's most needed is more buying."

So the Navy is determined to

How Navy's Hardware Budget Is Rising

(Millions in fiscal years)

Procurement	1960	1961	1962
Shipbuilding & Conversions	**$1,330.7**	**$2,245.6**	**$2,915.0**
Aircraft	**1,722.0**	**1,651.3**	**1,866.6**
Missiles	**451.1**	**543.8**	**868.4**
Ship & Weapons Support	*	**424.5**	**869.4**
Marine Corps	**133.9**	**91.2**	**270.0**
Total Procurement	*	**$4,956.4**	**$6,789.4**
Research, Development, Test & Evaluation	**1,066.5**	**1,304.8**	**1,306.0**
Total Procurement, R,D,T&E	*	**$6,261.2**	**$8,095.4**

*"Ship & Weapons Support" was not used as a budget category before fiscal 1961.

Asroc (upper left), a rocket assisted ASW torpedo, heads toward target

seek more procurement money outside the Polaris area. Admiral Mustin told Congress he needs at least an additional $1.1 billion a year to equip the ASW forces. Congress has been reluctant to go along with the request since Polaris demands so much hardware funding. But many Capitol Hill sources familiar with military needs feel the Navy won't get more than 45 Polaris submarines, and if the buildup from 29 to 45 is authorized, it will be at a slower pace than today's one-a-month rate. The move would free more Navy funds for ASW.

A $250-million-a-year research program for ASW, involving 169 major projects, will continue and no doubt will have to be increased as Russian capabilities grow. This year's $236 million research budget for ASW includes: Surveillance (sonar, radar); localization and classification (sonobuoys, magnetic anomaly detection equipment, mine hunting equipment); weapons (guidance for advanced torpedoes, torpedoes, fire control, mines, propellents); support (military oceanography, instrumentation, training aids, communications, navigation); vehicles (hydrofoils, nuclear powerplants, submarine structures, ship silencing techniques); and basic research (oceanography, acoustics).

A good example of the significance of ASW to metalworking is Dash, a drone helicopter that carries modern torpedoes. The Navy figures it has some 300 surface ships afloat which are essentially ASW in function. A ten year program calls for fitting each ship with three Dashes. Even if you don't count replacements that will be needed (and attrition could run as high as 40 per cent), this will be a $54 million market in ten years. Of interest to small firms: About 70 per cent of the Dash dollar is subcontracted.

Firms that think they can fit into ASW have two stops to make as they survey the field: Admiral Mustin's office in the Pentagon and the National Security Industries Association, Washington, a group which prepared a study on ASW problems last year for industry and the Navy.

• **Shipbuilding** — Navy Secretary John B. Connally points out that more than 70 per cent of the Navy's active ships were built during World War II. In the last 13 years, the Navy has averaged only 22 new ships a year. Under the new budget, 36 will be started, while modernization of old ships will be speeded.

One program requiring plenty of workaday equipment, as well as some of the more glamorous weapons: Fleet Rehabilitation & Modernization (FRAM). The longevity of old ships is stretched five to eight years with the addition of modern sonar, radar, and electronic equipment. Modernizing a destroyer costs $6.3 million; a new one with some additional equipment runs $37 million to $40 million. Workaday items purchased for modernized destroyers include: Winches, hoists, generators, pumps, switchboards, stowage and handling gear, boats, batteries, and propellers. Here's how the program shapes up.

Fiscal Years	No. Ships	Amount
1959	2	$7 million
1960	26	85 million
1961	27	104 million
1962	31	124 million
1963	33	200 million
1964	32	208 million
1965	22	171 million

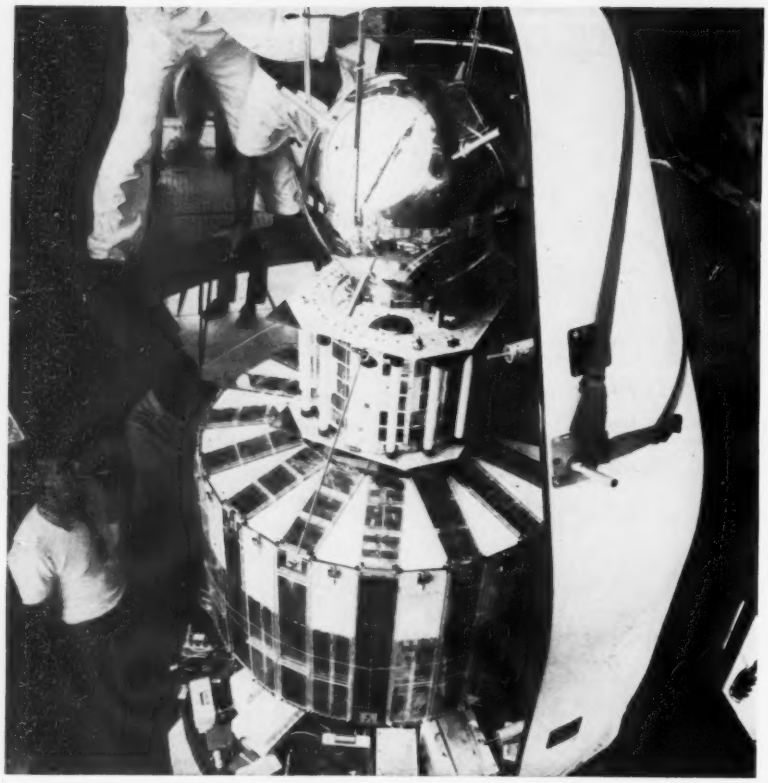
Another shipbuilding program is labeled "conversions." Destroyers and submarines are converted with the most modern equipment available, including Asroc, the rocket assisted torpedo; long range sonar; and Dash. A ship's useful life is extended about ten years. A destroyer conversion costs $11.3 million. Submarines get extensive treatment, including hull lengthening and replacement of machinery components. Fourteen destroyer and six submarine conversions are in the fiscal 1962 budget. Another 14 destroyers and 26 submarines will be converted in future years.

Here is a brief summary of other major Navy programs:

• **The Nuclear Navy**—Within the Navy, nuclear power for the submarine is unquestioned. Since surface ships are required in quantity, there is some question about converting them to nuclear power. Although the cost of nuclear plants has not risen, over-all shipbuilding costs have climbed, making it necessary to avoid this added expense.

• **Aircraft**—As of Apr. 30, eight firms were scheduled to deliver $1.8 billion worth of aircraft to the Navy. Fiscal 1962 obligations add up to another $1.4 billion worth. Backlogs of orders last April:

Grumman, $391 million; McDonnell, $362 million; North American, $296 million; Lockheed, $268 million; Douglas, $153 million; Sikor-



Technicians install triple satellite payload for Navy's Transit program

sky, $140 million; Chance Vought, $133 million; Kaman, $53 million. More than 1100 airplanes were on order from the eight companies.

• **Missiles**—The Navy carries a wide variety of missiles in its inventory. Attention should be called to two rapidly developing programs: Subroc and Typhon. Subroc is an underwater missile being hand built now by Goodyear. When the weapon is proved out, it will be fired from standard, 21 in. torpedo tubes. Typhon is a surface-to-air bird; its special capabilities include operation in a heavy, electronic, countermeasure environment.

• **New Ships**—Private shipyards continue to get more than 70 per cent (by dollar volume) of the Navy's new ship budget, including the Polaris. Research programs on hydrofoils and hull construction will dictate the ships of the next decade. Examples of blue sky thinking: Landing craft which approach the beach underwater and underwater aircraft carriers.

Interest in new materials for ship construction is constant. Steel will not be replaced by plastics in submarines, but nonferrous metals are being studied. Titanium may find a place in hydrofoil construction.

• **Space**—The Navy's $23 million space program is designed to take advantage of the present state of the art for practical Naval problems: Transit satellites for navigation; Tiros (with National Aeronautics & Space Administration) for weather forecasting; Advent (with the Army) for communications. Within the Navy, some see a future for Polaris as a satellite launcher. Others look farther ahead to the time when space vehicles will be so large the only practical launching platform will be the sea.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Consumers Predict Boomless Upturn

"RECOVERY but no boom" is the message of the latest University of Michigan survey of consumer attitudes and buying intentions. Most of the 550 persons interviewed feel it is a good time to buy home furnishings, refrigerators, stoves, TV, new cars, and houses. But the optimistic attitudes are not always backed up with intentions to buy.

Nearly two-thirds of those queried expect some price increases. While deploring this prospect, they express little resentment.

• **Evaluation**—Seventy-five per cent say business in general is better than it was a year ago. There is some confidence in the economic outlook for the next five years, but the view isn't as rosy as it was in 1955-56.

Most of those interviewed feel they are better off financially than they were a year ago. But fewer anticipate any fattening of their pocketbooks during the coming year. The university's Survey Research Center, which does the polls, concludes that the opinion is due to recent improvements in working hours and wages that preclude upward revisions.

While optimism and plans to spend are back at the prerecession level, they fall far short of survey results in the 1955-56 period. The Survey Research Center attributes the gap to the two recessions in the intervening years, a continuing high rate of unemployment, and the tightening of international tensions. The cumulative effect is a general feeling of insecurity and uncertainty.

Shell Molding Capacity Up

Lebanon Steel Foundry, Lebanon, Pa., has launched a 30 per cent expansion of its shell molding facilities. The shell molding operation is part of the Specialty Foundry Div. which is being rearranged and expanded to accommodate the increased production capacity. This is the second of two major growth programs which together have nearly doubled shell molding capacity within the last year, says J. M. Quinn, chief executive officer.

Auto Labor Pacts to Boost Costs At Least 3.7 Per Cent

THE AUTO labor contracts will boost the automakers' employment expenses by at least 3.7 per cent a year.

If that estimate is correct, the pacts are inflationary because it's doubtful that the car companies will boost productivity more than 2½ or 3 per cent annually.

• **Dissenter** — Most economists are predicting a general price rise of about 3 per cent in 1962, based in part on the expected effect of the auto contracts as they fan out into other areas and bring eventual price rises elsewhere.

But at least one economist, Walter Heller, chairman of the President's Council of Economic Advisers, doubts that the auto wage gains will lead to general price boosts. He says: "We are heartened that AMC and GM have announced a hold-the-line policy on prices . . . That and the aluminum announcement (of a price cut) represent hopeful portents for price stability."

AMC also insists that its profit sharing agreement will not boost inflation. Explains Edward L. Cushman, the company's labor vice president: "Since progress sharing is contingent on final results, it does not influence product pricing and is, therefore, noninflationary."

• **The Arithmetic**—The auto industry's old wage rates averaged $2.84 an hour. Add to that the average hourly fringe costs of 59 cents, and you get total average hourly employment expenses of $3.43. The three year contracts are estimated to cost 38 cents over the life of the pacts. That's an average of 12.7 cents a year, or 3.7 per cent of $3.43.

The 38 cent figure is 15 cents more than the 23 cent package that the UAW squeezed out of the automakers in 1958.

• **Auto and Other Prices**—While the price line on 1962 cars is being held generally, the higher wages of some 500,000 autoworkers will influence wage scales in industries far removed from autos because other employers have to compete for employees at a higher wage level. Such a condition leads to higher prices.

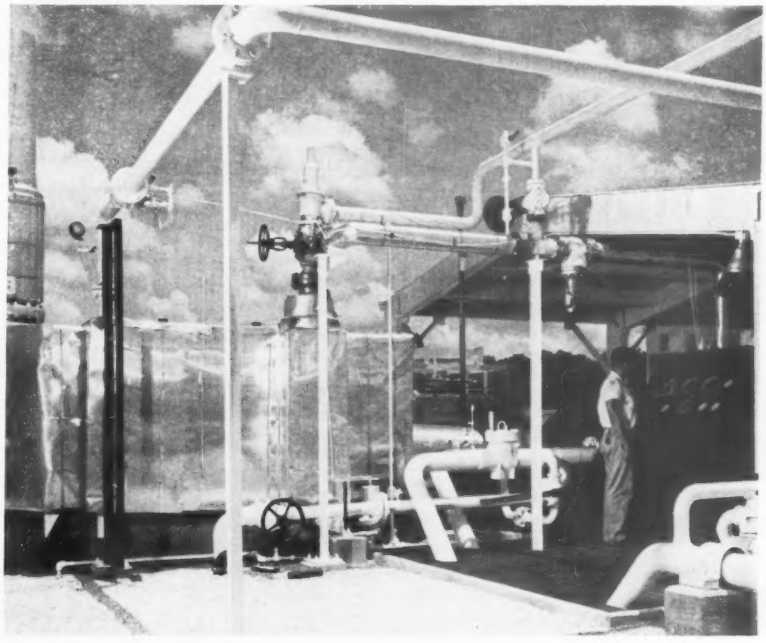
Equally important is the fact that the auto contracts set a wage pattern for other metalworking industries, some of which will raise prices to compensate for the higher labor costs.

• **Pricing Future**—The automakers remain discreetly silent when asked if they will call for a later price hike on cars if and when steel quotations go up. If ferrous levels do rise, look for auto increases too.

If steel doesn't change, watch for Detroit to hold off until the 1963 models appear. The marketers hope that sales of at least 6.8 million autos in 1962 will stave off the profit squeeze for a while.

U. S. Files Eighth Price Fixing Suit

THE U. S. government has filed its eighth price fixing suit. Defendants this time are nine electrical insulator manufacturers: General Electric Co., Lapp Insulator Co., I-T-E Circuit Breaker Co., A. B. Chance Co., McGraw-Edison, H. K. Porter Company Inc., Ohio Brass Co., Porcelain Insulator Corp., and Joslyn Mfg. & Supply Co. The amount of damages was not specified, pending completion of an analysis of government insulator purchases, the Department of Justice said.



Gas Turbines Getting More Efficient

CONTINUED PROGRESS in turbine engines makes them more attractive as prime power sources for tough industrial jobs. The Solar Aircraft installation (above) pumps 60 million cu ft of natural gas a day at the Cypress, Tex., station of Trunkline Gas Co. The installation is a tenth the size of conventional rigs of similar capacity, cost two thirds as much to install, and burns natural gas from the line, says Solar Aircraft Co., San Diego, Calif.

Goldberg Steps Up Minimum Wage Reviews

These industries are due for Walsh-Healey studies soon: Pumps, compressors, conveying equipment, scientific instruments, engines and turbines, motors and generators, electronics equipment

"WHILE President Kennedy writes letters to steel company presidents asking them to hold the line on steel prices, his secretary of labor is doing more to push inflation than any other man in Washington," charges a Maryland steel fabricator.

Labor Secretary Arthur Goldberg privately told friends last year that one of his major concerns was the minimum wage structure of U. S. industry. Since coming into office, the secretary has picked up the banner of the Walsh-Healey Act and appears bent upon bringing in a quantity of minimum wage determinations, with emphasis on the capital goods industries.

The Walsh-Healey Act, passed in 1936, empowers the secretary to set the minimum wage for production employees in any company working on a government contract that's valued at $10,000 or more. Practically speaking, it is a minimum wage above the $1.15 an hour provided by the Fair Labor Standards Act. A snowballing effect can't be avoided. It is impractical to segregate workers involved in a government contract to avoid paying all workers in a company subject to the Walsh-Healey law. And companies paying the legislated rate tend to have an influence on the wage structure within their industry.

Also, if the Walsh-Healey determination merely affected the lowest paid workers in a plant, there would be little to worry about. But when the minimum is raised 25 cents an hour, every job classification in the plant will tend to move up proportionately, either as a matter of collective bargaining with the union, or as a result of pressure from older, experienced workers in the case of a nonunion shop. It is ironic that the act was originally constructed to combat sweatshop practices, yet today its direct results are inflationary, and, charges the U. S. Chamber of Commerce, ultimately results in the loss of jobs.

At this moment, the machine tool industry is awaiting a determination by Mr. Goldberg. The minimum wage likely will be set at or near $1.75 an hour. If that happens, industry sources tell STEEL the resulting wage spiral will push some firms into bankruptcy.

In Washington last week, industry and trade association executives mulled over two problem questions: 1. Fight to repeal the act? 2. Seek better procedures to minimize the effect of the Walsh-Healey determination and obtain more valid statistics on the prevailing minimum so that the labor secretary's decision would have some semblance of reality?

Industry sources charge that the Wage & Hour Division of the Labor Department, which prosecutes the Walsh-Healey determinations, generally follows the naive rule that 50 per cent of the companies in any industry pay substandard minimum wages. This procedure is used: The industry is surveyed to learn the median minimum wage. The government then fixes on that figure, automatically ordering those below the median to come up to it.

New developments make the situation even more alarming. For example, the AFL-CIO demanded in the machine tool case that fringes be added to the minimum. They could amount to 22 cents an hour. Another union suggestion: That the lowest 1 per cent of the workers be excluded from the survey. That could boost the minimum even higher. Another gimmick is to ignore the fact that wages paid in larger plants are normally higher than those in smaller ones.

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WORLD MARKETS | NUMBER 2

JAPAN...

One in a series of reports examining metalworking market potentials in countries abroad. The first report—on Belgium—appeared in STEEL on July 10, p. 47. Next report: West Germany.

NEVER BEFORE has Asia witnessed an industrial boom like that of Japan today. Its production of goods and services is three times greater than it was in the prewar period. The nation's real rate of increase in gross national product—18 per cent in fiscal 1959-60 and 11 per cent in fiscal 1960-61—is the highest in the world. Output of Japanese industries multiplied 33 times between 1900 and 1960, while U. S. production multiplied eight times.

Poor in natural resources, overcrowded, misunderstood, with a reputation for cheap, copied goods, Japan faced a serious challenge a decade ago. The country has responded by becoming the Free World's seventh largest trading nation. Japanese imports totaled $4.49 billion last year and exports totaled $4.06 billion.

Japan is one of the top three foreign markets for the U. S., along with Canada and the United Kingdom. Last year, we sold $1.3 billion worth of goods to the Japanese and bought $1.15 billion from them.

Japan Offers 'Real Opportunity'

C. B. DeVLIEG, chairman, DeVlieg Machine Co., Royal Oak, Mich.

Mr. DeVlieg has recently returned from a U. S. trade mission to Japan. Here is his summary of the Japanese market for machine tools.

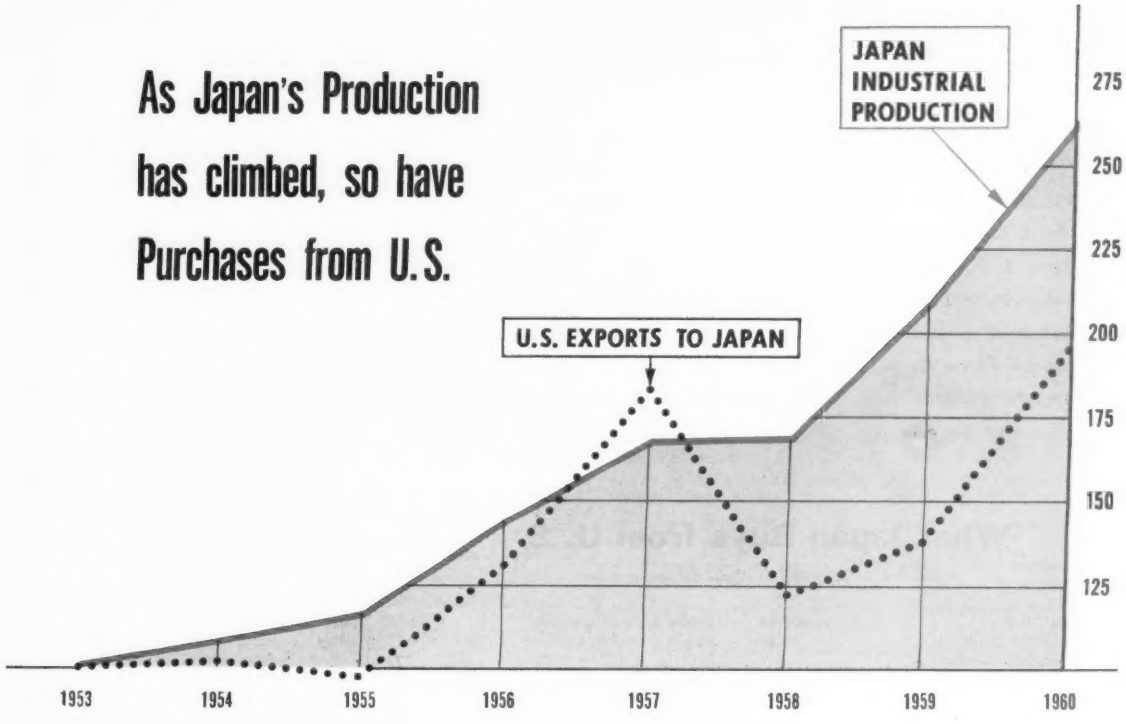
"My first trip to Japan was in 1952. We examined 42 plants and about 26,000 pieces of machine tool equipment and didn't find any worth bringing back. At that time, it was my opinion that the general state of the machine tool art in Japan was 30 years behind this country's. Japan now has a machine tool industry; it doesn't measure up in top quality to ours, but measured in the rate of improvement that has come, Japan has produced a phenomenal result.

"Japan will not be ready for some time to match this country in machine tools. There is not present there the great depth of engineering, technology, and skill. There is not the kind of a proving ground for providing research and development that we have in this country.

"Japanese manufacturers do not need our standard type of machine tools. They need from us the advanced type of machine. Japan is in the midst of a rebuilding program. The condition of the equipment there nine years ago was indescribable.

"Deliveries on machine tools in Japan are about two years from Japanese builders, and this affords a real opportunity in this country for those who have the kind of equipment the Japanese need."

Mr. DeVlieg points out that the Export-Import Bank of Washington recently extended a credit of $25 million to Japan to buy U. S. machine tools. The Japanese manufacturers oversubscribed by 3½ times—asked to purchase nearly $90 million worth of U. S. machines. Says Mr. DeVlieg: "So our problem of exporting machine tools to Japan is not so much the high cost of our machines, which is justified because of superior performance qualities, but we could expand the market very greatly by a sensible and practical extension of credit. They are getting it from European builders, and this oversubscription was a direct indication that the users want American tools."



(For products involved, see table on Page 32.)

Japan has become a market that the aggressive U. S. metalworking firm dare not disregard. But the firm planning to enter the market for the first time may be slightly discouraged by Japan's intricate system of stringent import controls. Extensive liberalization has been promised—and some concessions have been made—but the rate of revision has been slower than U. S. exporters had been led to believe by Tokyo's effective publicists. Some raw materials (such as pig iron and bauxite) and some heavy metalworking items (such as locomotives and various types of machinery) have been placed under the Automatic Approval System—commercial banks may issue import permits, on a first-come, first-served basis, within the limits set in the foreign exchange import budget.

Japan has promised liberalization on nearly 90 per cent of its imports within three years. The "Principles of Liberalization Planning" were published in June, 1960. Last December, "speedier action" was promised. It has come on a fairly narrow basis. Examples: Such "essential" items as frog meat, goldfish, and snails now get automatic approval. So do products like buttons, toys, and Christmas cards which the nation does not need to import.

Importantly though, makers of industrial machinery and materials have fared relatively well, largely because Japan needs such items to improve and expand its plants and feed its booming metalworking industries.

• **Big Growth Coming**—Under Japan's ten-year development program, its imports will have to expand at an annual rate of 5.6 per cent between now and 1970. If the U. S. continues to supply nearly one-third of Japan's imports, the nation will become a $2.5 billion per year market by 1970.

Evidence that Japan will become an even more important market for U. S. metalworking than it already is can be seen in the goals for the nation's development program shown on Page 32.

But you don't have to wait until 1970. You can cash in on a big market in Japan now. C. B. DeVlieg, chairman, DeVlieg Machine Co., Royal Oak, Mich., who recently toured Japan on a U. S. trade mission, attests to that on Page 30.

You get further proof of Japan's boom—and indications of the nation's import needs—by investigating its present industrial activity . . .

• **Electric power consumption** is increasing at about 18 per cent annually. Industrial power demand in fiscal 1959-60 reached 62.5 billion kilowatt-hours, or 2½ times the 1951-52 total. Generating capacity, now estimated at nearly 19 million kw, must be raised by more than 3 million kw annually for the next ten years to meet anticipated demand.

• **The Japan Atomic Energy Commission** has announced a 20 year program under which atomic powerplants with a capacity of 7 million to 8.5 million kw will be built.

• **Crude steel output** during calendar 1960 hit a record 22.1 million tons—up 33.2 per cent from 1959's, making Japan the world's fifth largest steel producer. The country expects to more than double its steel capacity in the next ten years—to approximately 48 million tons annually.

• **Auto output** is increasing significantly. Produc-

Japan's 10 Year Development Program

	1960	1970†
Gross National Product (billions)	$38.7	$72.2
Per Capita GNP (dollars)	$415	$706
Gross Capital Formation (billions)	$14.1	$23.0
Plant & Equipment Spending (billions)	$8.1	$10.0
Labor Force (millions)	44.5	49.0
Industrial production (1955 = 100)	227	592
Electric Power Output (billions of kw-hr)	115	260
Imports (billions)	$4.5	$9.3

†In constant 1958 dollars.

What Japan Buys from U. S.

(Selected U. S. exports in 1960—Millions of dollars)

Machine Tools	$37.14
Metal Cutting Types	25.20
Lathes, Screw Machines & Turning Machines	3.81
Boring Machines	3.62
Tapping & Threading Machines	0.05
Milling Machines	2.08
Gear Hobbing & Cutting Machines	5.36
Drilling Machines	0.30
Planers & Shapers	1.27
Grinding Machines	5.14
Sawing & Cutoff Machines	0.04
Honing & Lapping Machines	0.73
Polishing & Buffing Machines	0.24
Other Types & Parts	2.56
Metal Forming Types	11.94
Presses (hydraulic & mechanical)	6.45
Bending & Roll Forming Machines	1.50
Punches & Shears	0.30
Forging Machines	2.69
Parts & Accessories	1.00
Material Handling Equipment	1.78
Power Generating Machinery	8.69
Heat Treating Equipment	2.68
Electric Motors & Controls	1.45
Measuring & Testing Equipment	12.11
Engineering & Surveying Instruments	3.83
Pumps, Compressors, Heat Exchangers, Air Purification Equipment, etc.	5.06
Safety Equipment	0.13
Metal Office Furniture	0.16
Portable Metalworking Tools	0.25
Rolling Mill Machinery	18.76
Cleaning & Finishing Equipment	3.08
Foundry Equipment	0.61
Bearings	0.88
Valves & Parts	2.75
Packaging Machinery	0.39
Gear Reduction & Power Transmission	1.19
Tractors & Parts	2.12
Motor Vehicles & Parts	5.40
Watercraft	2.02
Aircraft & Parts*	25.90
Ores, Concentrates, Scrap & Forms:	
Aluminum	9.75
Copper	67.60
Nickel	3.16
Zinc	4.31
Other Nonferrous	12.75
Iron Ore & Concentrates	8.62
Fabricated Metal Products	5.00
Pig Iron	2.73
Iron & Steel Scrap	115.48
Steel Mill Products	14.70
Bars	0.12
Sheets & Strip	5.76
Tin Mill Products	5.72
Pipe & Tubing	0.33
Plates	2.34
Shapes	0.21

Source: U. S. Department of Commerce.
*Data are incomplete.

tion last year totaled 481,600 motor vehicles—up 83 per cent from the 1959 figure. The 1960 output consisted of 165,000 passenger cars, 308,000 trucks, and 8400 buses.

• **About 80,000 machine tools** were built in Japan last year—up 142 per cent since 1958, but far short of the nation's needs—in number, complexity, and variety.

• **The world's largest motorcycle maker,** Japan built 1.5 million units in 1960.

• **Also the world's top shipbuilder,** it launched 649 ships last year totaling more than 1.7 million tons. (Britain is the world's second largest shipbuilder. West Germany is third.)

• **Output of electronic products** in Japan last year exceeded $1 billion—double the 1958 output. Japan produces more transistors than any other nation.

• **Production of still cameras** totaled roughly 2 million units in 1960. And the nation also turned out about 550,000 movie cameras.

• **Television set production** climbed to 3.6 million units in '60—up from 1.2 million in 1958.

• **Output of radios** soared to nearly 13 million units last year vs. about 5 million in 1958.

• **About 1.5 million washing machines** were built in Japan last year—more than triple the 1955 output.

• **Refrigerator production** has more than doubled since 1958, totaling 904,000 units in 1960.

• **Japan's electric motor production** reached 2.6 million kw in 1960—up 263 per cent from 1958.

• **Primary nonferrous metal production** is rising. The industry's production index (1955 = 100) reached 223 at the beginning of this year.

• **Secondary nonferrous metal production,** on the same index base, climbed to 261 in January, 1961.

• **Capacity to produce plastics** is expected to reach 665,000 tons by the end of this year.

• **More than 40,000 manufacturing plants** with 30 or more workers are in operation, it is reported.

• **Fishing (or "sea farming")** remains one of Japan's most important industries. It provides work for around 3 million fishermen. Annual sales are roughly $700 million.

• **Investment in Japan**—Japanese industry is raising an increasing portion of its financial requirements on the home capital market, thanks to a substantial increase in personal savings and stock market fever.

Quick Facts About Japan

POPULATION—94 million. Density is 654 per square mile. Japan is the world's fifth most populous country —after Red China, India, Russia, and the U. S.

AREA—About equal to California. Japan is composed of four large islands (Honshu, Hokkaido, Kyushu, and Shikoku) and minor satellites.

CURRENCY—Yen. Par value established with the IMF (International Monetary Fund): 360 yen equal U. S. $1. There are coins of 1, 5, 10, and 100 yen and notes of 100, 500, 1000 and 10,000 yen.

CAPITAL—Tokyo (on the island of Honshu).

WEIGHTS AND MEASURES—The metric system was put in force nationally on Jan. 1, 1959, with certain exceptions allowed until Mar. 31, 1966. Under the old system, 1 kin equals 1.323 lb, 1 koku equals 16.381 quarts, 1 shaku equals 0.331 yd, 1 tsubo equals 3.954 sq yd.

HOLIDAYS—New Year's Day (Jan. 1), Adults' Day (Jan. 15), Vernal Equinox Day (Mar. 21 or 22), Emperor's Birthday (Apr. 29), Children's Day (May 5), Autumnal Equinox Day (Sept. 23 or 24), Culture Day (Nov. 3), Labor-Thanksgiving Day (Nov. 23).

FISCAL YEAR—Begins Apr. 1.

RELIGION—Shinto, Buddhism, and Christianity.

COMMUNICATIONS—The Ministry of Postal Service operates nearly 16,000 post offices. There are around 4.4 million telephones, with service rendered by the Nippon Telegraph & Telephone Public Corp. Radios will be found in nearly 9 out of 10 homes.

FOR MORE INFORMATION . . .

The Japanese Factory: Aspects of Its Social Organization (Glencoe: Free Press, 1957).

Japan's Economic Recovery (London: Oxford University Press, 1958).

Sources of the Japanese Tradition (New York: Columbia University Press, 1958).

The Japan Who's Who (Tokyo: Tokyo News Service, annual).

That Shall I Read on Japan: An Introductory Guide (New York: Japan Society, 1957).

Rundt's Market Report No. 304/5 (S. J. Rundt & Associates, 130 E. 63rd St., New York, Feb. 23, 1961).

Import Tariff System of Japan, Establishing a Business in Japan, and *Living Conditions in Japan* (Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., or local Commerce Department field offices).

Japan's Iron & Steel Industry, 1961 (Tokyo Foreign Service, Central P. O. Box 1157, Tokyo, Japan).

Japan (Foreign Information Service, First National City Bank of New York).

U. S. Trade with Japan (U. S.-Japan Trade Council Inc., 1000 Connecticut Ave., Washington 6, D. C.).

(Around 10 million Japanese are stockholders, and around 6000 investment clubs are flourishing.)

To attract additional capital, Japan is showing a more liberal attitude toward foreign investors. Repatriation has been eased, and the limit on foreign equity investment in Japanese companies is being raised. Since 1958, more than $100 million of Japanese debentures have been floated in the U. S. market, and U. S. direct investments in Japan reached $210 million in 1959, about double the 1954 figure.

Tokyo has recently approved plans for several New York banks to issue ADRs (American Depository Receipts, or certificates representing underlying foreign securities deposited with correspondent banks abroad). The arrangement probably won't raise much capital under present Japanese regulations since Americans must wait two to four years to take their profits out of Japan. (Alternative: Sell the ADRs inside the U. S.)

• **Consumption Boom**—Consumer spending in Japan, at about $21 billion in 1960, has been growing at a rate of about 8 per cent annually. The typical Japanese urban family now has an income equivalent to about $1000 a year. Much of the increased purchasing power is being used for consumer durable goods, and appliance sales are rising rapidly. Installment payments play an important role—more than half the sewing machines and TV sets are sold that way. And leisure spending is soaring—especially for phonograph records and tape recorders. Eating and drinking habits are changing too. Example: Beer consumption now exceeds that of sake (rice wine). Canned foods are in demand. Per capita consumer spending is expected to increase 2.5 times by 1970, with passenger car ownership rising about seven times and residential housing increasing by 5 million to 6 million units.

• **Summary**—Japan's industrial expansion could well continue at its present high rate if authorities succeed in braking the boom without choking it. Productivity is rising steadily; export prices have increased less than in most competing countries; the labor supply is ample. Expanded demand for both industrial and consumer durable goods, accompanied by a record import budget, record foreign exchange holdings, and some easing of restrictions on private foreign investment offer enhanced opportunities for U. S. metalworking. Conclusion: You probably can't afford not to investigate the Japanese market. With aggressive marketing, U. S. metalworking can continue to expand its sales to our dynamic Asian ally.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Inventory Management Simulator program at...

Clark Equipment... improves customer

■ **High-capacity memory.** Two IBM 305 Data Processing Systems with RAMAC keep track of 75,000 replacement and repair parts in Clark's Chicago parts warehouse. ■ **The computer has the facts.** As soon as shipments arrive at the warehouse, an operator, using this remote inquiry station near the loading platform, finds out from the computers where various items go. ■ **Customer service first.** Using this remote inquiry station in the sales department, the operator gets information from the computer while the customer is on the phone.

Clark Equipment Company has prepared a computer program called an Inventory Management Simulator. The program allows Clark management to study the possible effects of decisions on future customer service and future warehouse profitability. When management gets the computer's report, it is in a position to make new rules for the operation of its parts warehouse.

Here's what's happened since Clark put the new program into operation: ... improved customer service... practically eliminated back-order problem . . . reduced the putaway time for incoming material by more than 50 per cent . . . reduced emergency order shipping time by 50 per cent . . . enabled a physical inventory to be taken without any interruption of service to customers.

service...with less inventory

Availability highest ever. Inventory management is a complex job at Clark. Its Chicago warehouse is one of the busiest and largest in the country. Before the Simulator program was developed, the warehouse carried an inventory of 85,000 individual replacement and repair parts. Use of the program helped transfer the investment in inventory to those parts most frequently called for, giving high availability with less investment.

Management Operating System.* Clark installed two IBM 305 Data Processing Systems with RAMAC®. These computers store, update, and offer on an instant's notice information on almost every aspect of the warehouse operation including complete information on every one of the 75,000 items maintained in stock.

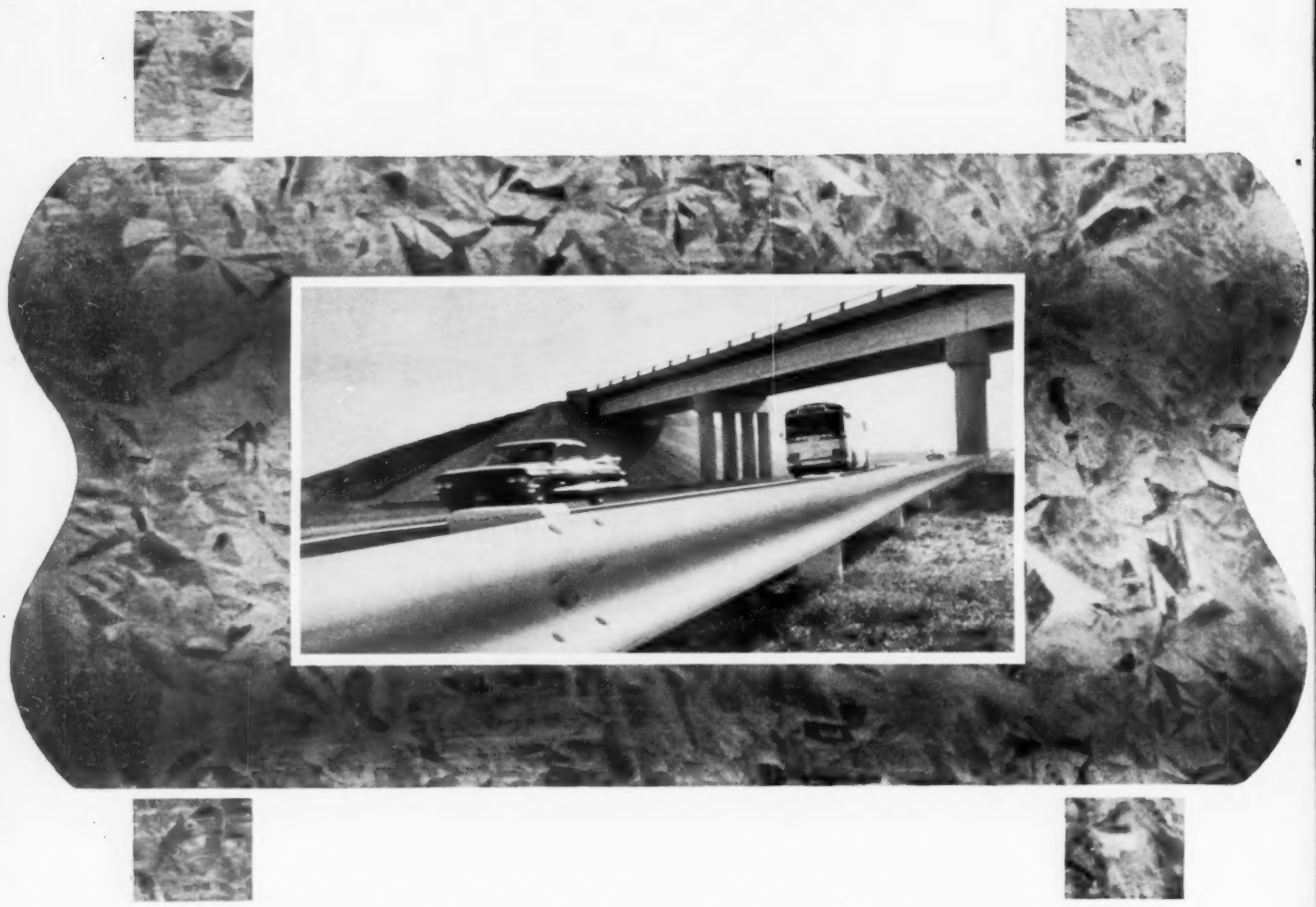
Now, Clark is assured of maintaining just the right level of stock for each item. The procurement formulas, developed from the Inventory Management Simulator, even recommend how large a purchase order should be placed for each item and where it should be placed.

If you have an inventory problem, why not consider a simulation program? You don't have to have your own computer. We can supply you with an Inventory Management Simulator...you can rent time on a computer. Result...improve the profitability of your warehouse operation.

**A Management Operating System uses IBM computers to make routine business decisions and take action automatically ...flags problems that need management's special attention... frees management to concentrate on the big problems and on long range planning. As a result, it gives tighter control of all business operations...and helps cut costs.*

IBM®
DATA PROCESSING

Stand-up-ability—strong reason why more and more roads are . . .



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Guard rails of galvanized steel are gaining favor . . . fast! Big reason: stand-up-ability . . . a neat knack of holding the line not only against impact, but also against the more gradual gnawing away that is done by time and the elements. From their inner steel core to their outer zinc coat, galvanized guard rails and median barriers stand up long and strong to deliver topmost protection with minimum cost and upkeep.

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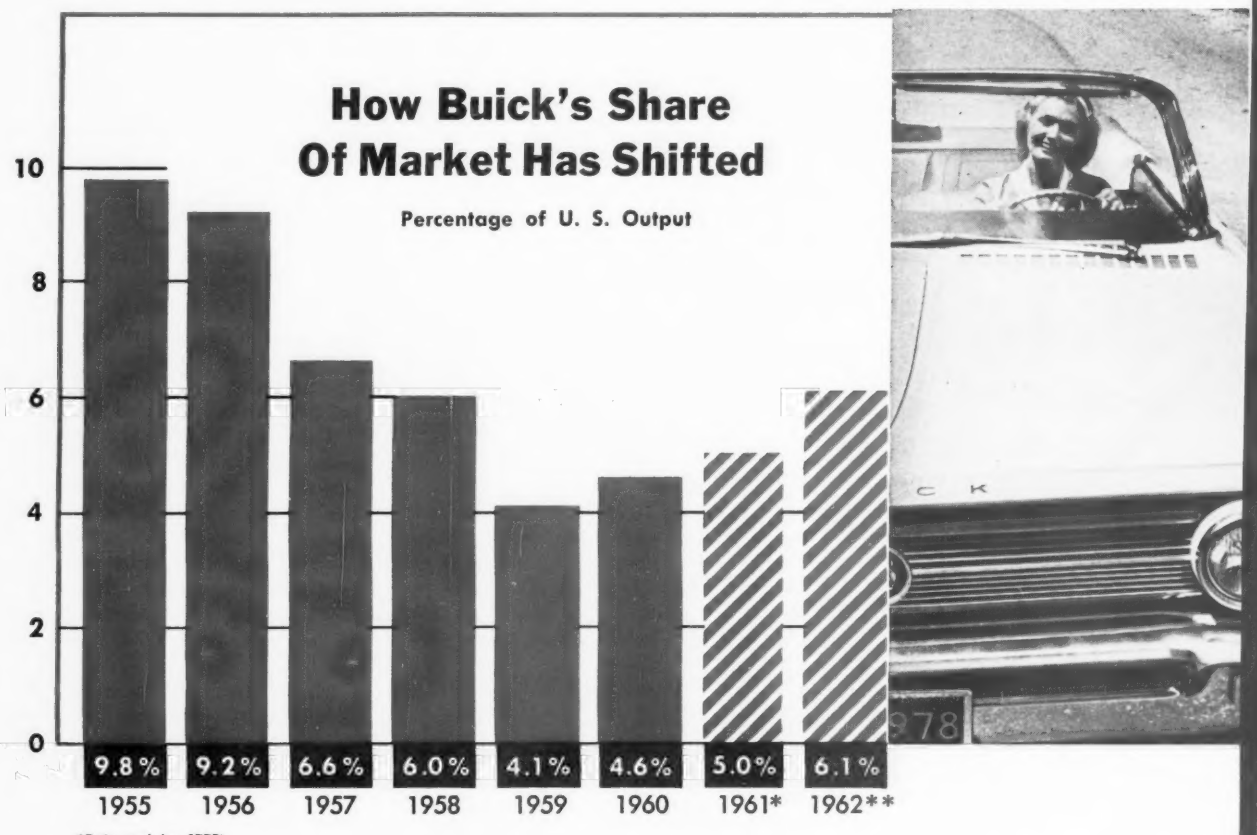
MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

Divisions of
NATIONAL STEEL CORPORATION



*Estimated by STEEL.
**Buick's projection.
Other figures from *Ward's Automotive Reports.*

Buick Toughens Up for Comeback Fight

A FLOCK of hungry competitors chased Buick from third to eighth place in industry sales in six years, but Edward D. Rollert, general manager, believes the Flint, Mich., carbuilder is now in shape to fight back against competition that's as tough as ever. He's looking for 400,000 sales in 1962.

• **King Buick**—For years, Buick had been known as the "salesman's car." It was the first step up the prestige ladder for many middle managers. Owner loyalty was high. The division pioneered such developments as the Dynaflow transmission and hardtop styling.

After World War II, Buick retained its No. 4 position—behind Ford, Chevrolet, and Plymouth. For three years, 1954-56, it outsold Chrysler's low priced car and reached third place.

• **Takes Fall**—In 1956, Buick ran into a warranty problem on brakes. In 1957, makers of General Motors' medium priced lines "rediscovered" the split rear window. Such "developments" tended to disenchant established Buick owners. In the 1958 rush for economy transportation, the one time darling of the medium price class was "overweight, overpriced, and undersexed."

A change to broad finned styling in 1959 turned out to be too radical for the Buick buffs. The change from traditional series names didn't help sales either. Oldsmobile and Pontiac were pushing hard. Rambler cashed in on the demand for compacts. Buick slipped to seventh, then to eighth place in industry standings. Last year's registrations hit an all-time low of 165,414 units.

• **Regrouping Starts**—May 1, 1959, saw Edward D. Rollert installed as Buick's general manager. He came from GM's Harrison Radiator Div. with the reputation of being a troubleshooter. One of his first steps was to rebuild Buick's reliability image. "I don't know of any word that's more ambiguously used than reliability," remarked Mr. Rollert last year.

John R. Gretzinger was named

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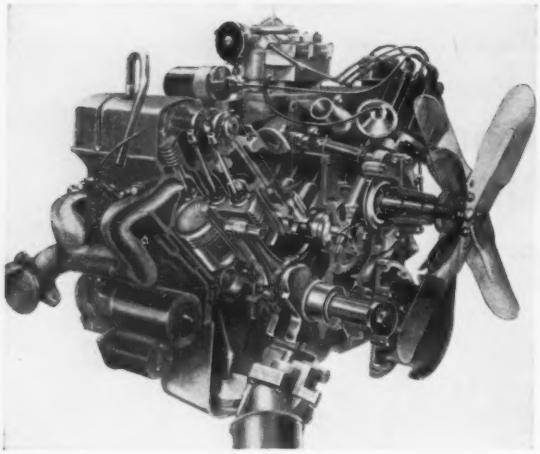


Buick's 90 Degree V-6

THIS POWERPLANT with a gray iron block and valves in head is 140 to 179 lb lighter than comparable, in-line, six cylinder engines. With automatic transmission, it's 46 lb heavier than Buick's 155 hp, aluminum V-8. Buick engine designers say the V configuration makes for a lighter, more rigid, and more compact engine than in-line sixes. Its connecting rods and crankshaft are cast, pearlitic malleable iron.

In addition to lower initial cost, the division claims fuel economy is 11 to 18 per cent better than engines with comparable horsepower. It says performance in the 0-60 mph range is 22 to 24 per cent better. Oil capacity is four quarts. Buick recommends 4000 mile oil changes.

Here's a rundown on specifications:

Displacement	198 cu. in.
Horsepower	135/4600 rpm
Comp. Ratio	8.8:1
Bore/Stroke	3.6 x 3.2 in.
Torque	205/2400 rpm

director of reliability and quality control. By last spring, Mr. Rollert could report that customer field complaints had been cut in half since he took over the division. At the preview of 1962 cars three weeks ago, he added that warranty claims had been trimmed back more —although he declined to say how much.

Suppliers and dealers thought that the '61 Buick was a well built car. Sales through August were 7 per cent ahead of the year ago pace, while industry sales were down 15 per cent.

Cost cutting has been another major project. Buick's facilities were geared up to build more than 400,000 cars annually, a mark it last achieved in 1957. When it built 257,124 cars in 1958, Edward T. Ragsdale, then general manager, confessed to STEEL that the division had gone considerably under its standard volume quota.

It's now believed (unofficially) that even with the addition of the Special line, Buick will show a profit if it produces 280,000 cars in 1962. It's understood that Buick made several moves to lower its break-even point: It reportedly replaced or modernized almost two-thirds of its machine tools. A supplier says it consolidated facilities and reduced floor space requirements by 20 per cent. Divisional sources report that a stringent preventive maintenance program has been instituted. Instead of shipping parts directly from its manufacturing plants to assembly lines, the division has established a central warehouse for production parts, which schedules shipments as they're needed. The setup permits smoother production flow and avoids runouts or inventory pileups at assembly points. Venders still ship bulky items like bumpers to assembly plants, but Buick has considered putting in its own bumper line. It now buys bumpers for its Specials from Oldsmobile. The larger ones come from Rockwell Standard Corp.

• **Buick Tries Again** — For 1962, Buick is keeping last year's body shells and has made only minor exterior styling revisions. It dropped the Electra series, but it is keeping the styles in the Electra 225. Convertibles have been added to the Special series. They'll feature a counterbalanced, manual top.

The most significant change in materials: The switch from aluminum to zinc diecast grilles for the entire Special series. Mr. Rollert anticipates 40 per cent of the division's 1962 sales will come from this compact car. Special and Skylark sales are expected to total 35 per cent, or 105,000 units, this year.

Mr. Rollert says owner loyalty is rated at 68 per cent, the highest it has been in the last five years. The 3150 dealers handling Buick have 18,000 of the 1962 cars on hand, a third of them Specials. Less than 6500 of the 1961 models remained at introduction time.

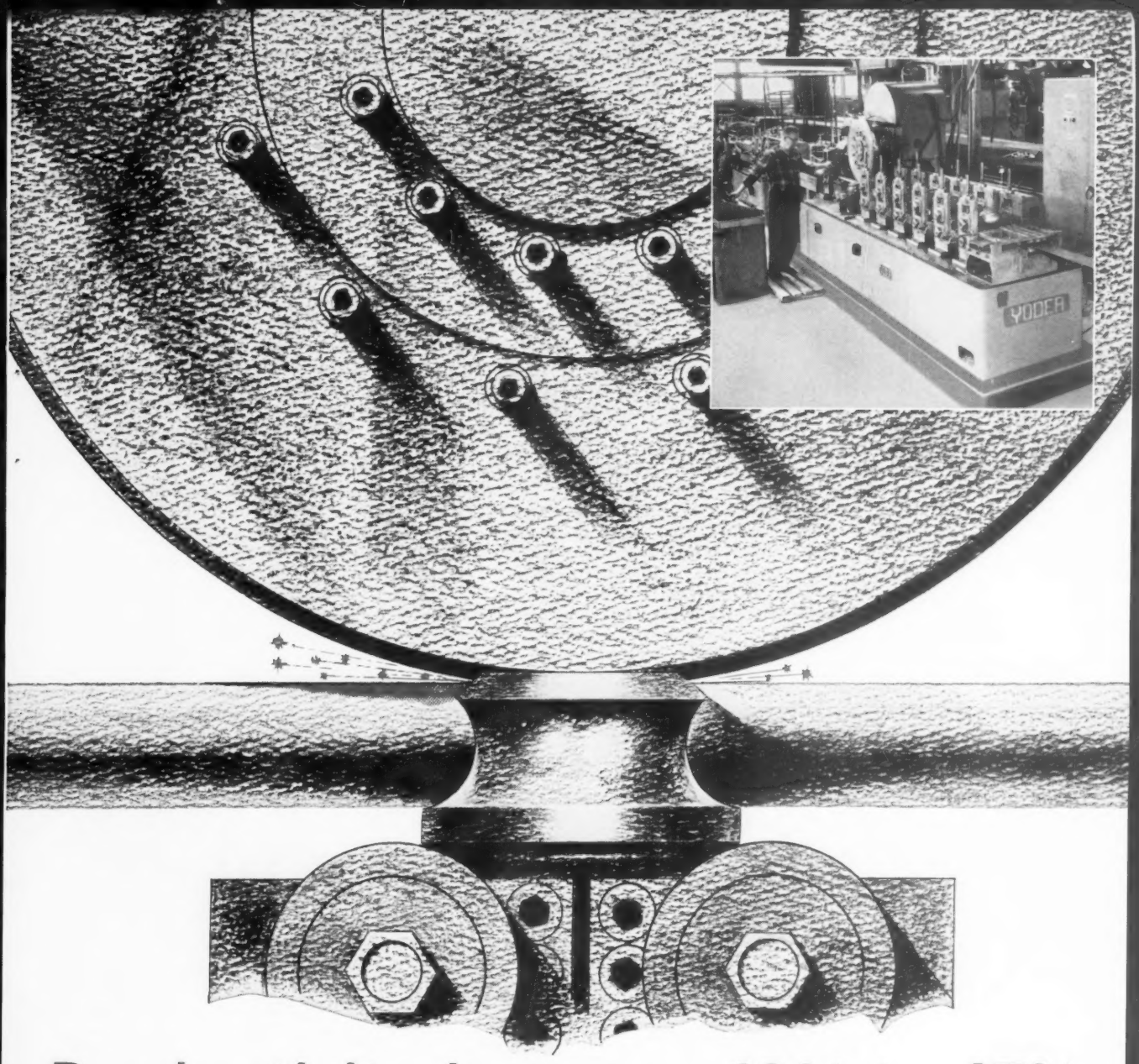
U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	599,474	613,136
July	399,191	434,377
August	195,266	305,514
8 Mo. Totals	3,371,174	4,549,385
September	.....	407,691
October	.....	617,972
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108

Week Ended	1961	1960
Aug. 26	61,401	38,952
Sept. 2	90,983	51,647
Sept. 9	83,421	52,635
Sept. 16	64,164	85,879
Sept. 23	74,829†	120,722
Sept. 30	100,000*	134,118

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.



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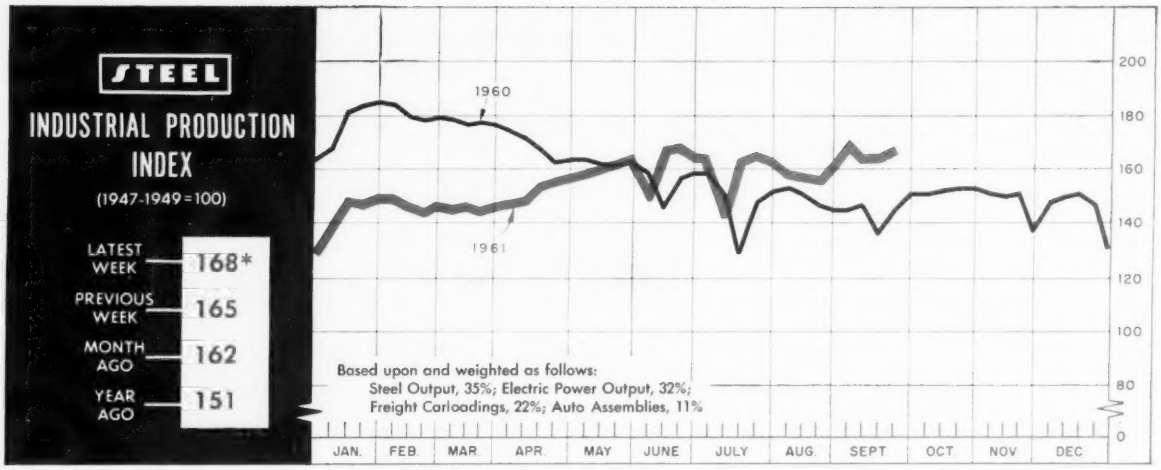


*Week ended Sept. 23.

Production Index Nears Record Level

STEEL's industrial production index (above) is heading for two records in the next few weeks: 1. It is about to pass the high point for 1961. 2. By the end of the year, it will probably surpass the all-time peak which has stood since the week ended Jan. 24, 1960.

• **Blame It on Autos**—At a preliminary 168 (1947-49=100) for the week ended Sept. 23, the trend line is only 3 points under the best reading for the year to date—posted the week before Labor Day. If it weren't for the auto labor difficulties, the mark would have fallen the week after Labor Day. The strike at General Motors Corp. cost the industry at least 140,000 units and the production index about 4 points. Indirectly, it held steel production back for three weeks, making it a neutral factor in the composite production index. It also had some effect on freight carloadings, which normally benefit from the buildup of new model production and transportation.

Now that the GM strike is settled, production should gradually return to normal unless the Auto Workers strike at one of the other major producer's plants. Industrial production should set the first in a new series of high marks during the week ended Sept. 30 or this week. Steel production has already shown the results of increased automotive activity, moving up to 2,114,000 ingot tons during the week ended Sept. 23. Auto production probably moved up about 25,000 units last week and should go higher this week. Freight carloadings, which are entering a period of seasonally heavy business, should benefit further from increased traffic in steel and autos.

• **Credit Autos, Too** — Only 17 points separate the latest reading of STEEL's index and the all-time high of 185. Judging from the predictions

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,120[1]	2,114	1,558
Electric Power Distributed (million kw-hr)	15,750[1]	15,869	14,556
Bituminous Coal Output (1000 tons)	8,755[1]	7,120	8,205
Crude Oil Production (daily avg—1000 bbl)	7,130[1]	7,111	6,877
Construction Volume (*ENR*—millions)	$399.5	$523.3	$368.4
Auto, Truck Output—U. S., Canada (*Ward's*)	98,992[1]	87,719	145,455
TRADE			
Freight Carloadings (1000 cars)	600[1]	594	618
Intercity Truck Tonnage (changes from year ago)	+3.0%	+0.4%	−1.1%
Business Failures (Dun & Bradstreet)	292	275	305
Currency in Circulation (millions)[2]	$32,775	$32,836	$32,171
Dept. Store Sales (changes from year ago)[2]	0%	−1%	−5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$31,083	$26,301	$31,496
Federal Gross Debt (billions)	$293.2	$293.5	$288.5
Bond Volume, NYSE (millions)	$26.4	$28.0	$23.4
Stocks Sales, NYSE (thousands of shares)	15,915	14,897	14,930
Loans & Investments (billions, adjusted)[3]	$115.1	$114.3	$105.3
U. S. Govt. Obligations Held (billions)[3]	$33.2	$33.3	$27.5
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	225.3	226.9	230.1
All Commodities[6]	118.6	118.7	119.4
Commodities Other than Farm & Foods[6]	127.2	127.3	128.2

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

of STEEL's Panel of Economic Consultants (see Page 21) that mark should fall this quarter, but how soon will depend largely on whether the auto industry meets its fourth quarter goals. The panelists forecast production of 1,800,000 units in the next three months. That could be raised considerably if automakers determine to recoup September's strike losses. Or it could be cut if the union calls another strike this month against Ford or Chrysler.

If the economists are correct in forecasting steel production of 100 million ingot tons this year, the industry must increase weekly output considerably in this quarter. Even if the auto industry fails to live up to expectations, increased demands of other durable goods producers should boost steel production schedules moderately. Also, railroad freight carloadings should rise as more goods are shipped to market and the ore producers fatten their winter stockpiles. A late grain season will add to the upturn in loadings.

The only depressant on the index at this time is output of electricity, which has just passed the first of two annual peak seasons. Warm weather well into September minimized the effects of the seasonal downturn, but the decline will be more pronounced this month. However, the dip will be shallow and short as industry and colder weather put more demands on the utilities. Power generation will start rising about the same time the other three factors are nearing their peaks in early November.

• **Net Effect**—Chances are good that the convergence of the four trends early next month will result in a record for STEEL's industrial production index. And if previous patterns hold, the trend line will continue upward until the final peak of 1961 is established in the week before Christmas.

FRB Gains to Be Small

In terms of the Federal Reserve Board's industrial production index, the monthly gains in the fourth quarter should be steady but unspectacular. Noel McBride, senior economist for the Federal Reserve Bank of Cleveland, points out that in a comparable stage of the 1959 recovery—six months after the trough—the economy was still climbing toward the previous peak. In the 1961 recovery, the previous high has been passed. In 1959, the FRB index showed a gain of 3 points between the sixth and seventh months. To show the same percentage gain between the similar months of the current cycle would mean a September reading of a little over 116 compared with 113 for August.

"No increase of that magnitude appears to be in store," he declares. "Indeed, should there be large increases in production in the months ahead, it would likely come as a consequence of circumstances few persons would like to see, that is, through a buying spree as a result of international tensions or widespread fear of inflation." Neither seems likely in view of the sluggishness in retail sales.

Plant Expansion Coming

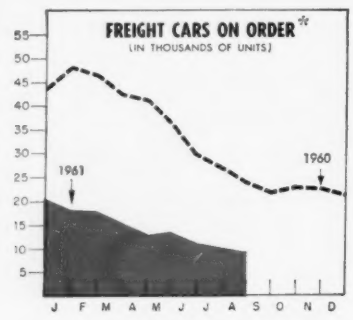
The emphasis in plant and equipment expenditures is about to change, asserts Prentice-Hall Inc., Englewood Cliffs, N. J. For several years, plant capacity has been considered more than ample to meet normal needs, so the trend has been to modernization. By early 1962, P-H feels producers will be pushing against the capacity ceiling—or close enough to it to raise a question about expansion.

"That's evident from the trend in industrial building and from the mounting pileup of factory projects on manufacturers' shelves, ready for contractors' bids. Factory construction this year will hit $3 billion for the first time since 1957 and may well surpass that record year's total in 1962."

STEEL's Panel of Economic Consultants predicts that the annual rate of spending for plant and equipment will reach $38 billion by the third quarter of next year, passing the record rate of $37.8 billion set in the summer of 1957. Two panel members suggested a rate of $40 billion. P-H believes that is a distinct possibility by early 1963, which would be 20 per cent above the cyclical low mark registered last spring.

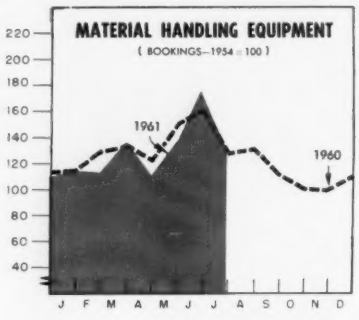
"After allowing for increasing equipment and plant construction costs, however, the physical volume of plant and equipment purchases won't equal the 1957 record until late '62 or early '63," the company concludes.

THE BUSINESS TREND



	Domestic Awards		Backlogs (end of month)	
	1961	1960	1961	1960
Jan.	1,339	5,742	18,894	48,170
Feb.	1,536	3,211	18,429	45,323
Mar.	1,796	1,957	15,801	42,131
Apr.	2,040	5,352	13,658	41,003
May	3,666	2,285	13,964	36,106
June	1,214	316	11,821	29,555
July	2,452	1,331	10,644	26,658
Aug.	1,474	1,343	9,690	23,866
Sept.	....	2,206	.....	21,662
Oct.	....	5,864	.....	22,900
Nov.	....	3,740	.....	22,781
Dec.	....	2,705	.....	21,070
Total	....	36,368		

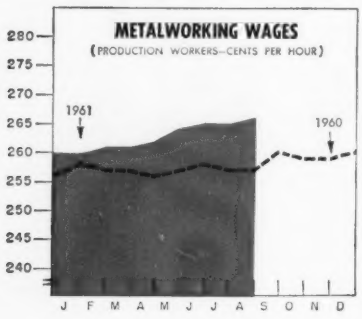
*Domestic only.
American Railway Car Institute.



	1961	1960	1959	1958
Jan.	116.24	114.96	115.84	93.07
Feb.	114.39	128.74	124.77	93.49
Mar.	136.96	133.60	146.36	97.89
Apr.	109.85	122.41	147.28	122.36
May	136.47	150.33	164.45	118.04
June	175.51	160.23	170.72	131.15
July	130.72	126.79	130.26	134.34
Aug.	.....	131.33	87.02	104.46
Sept.	.....	111.11	126.43	85.41
Oct.	.....	99.89	131.09	111.35
Nov.	.....	98.96	124.16	110.88
Dec.	.....	110.00	113.78	105.97
Avg	.....	122.55	131.85	109.87

Material Handling Institute Inc.

Charts copyright, 1961, STEEL.



1960	Prim. Mtls.	Fab. Prod.	Machinery	Elec. Mchy.	Trans. Equip.
Aug.	280	246	256	230	275
Sept.	281	248	258	232	281
Oct.	281	248	258	232	281
Nov.	279	246	259	233	279
Dec.	283	247	260	233	279
1961					
Jan.	285	246	261	235	278
Feb.	285	247	261	235	278
Mar.	286	247	262	235	277
Apr.	288	249	263	236	279
May	290	250	263	236	280
June	292	251	263	237	281
July	293	251	263	238	282
Aug.	294	252	263	238	283

U. S. Bureau of Labor Statistics.

1960	Prim. Mtls.	Fab. Prod.	Machinery	Elec. Mchy.	Trans. Equip.
Aug.	910	819	1,112	861	1,036
Sept.	905	835	1,104	877	1,135
Oct.	891	834	1,087	839	1,149
Nov.	871	816	1,087	867	1,153
Dec.	851	794	1,081	844	1,125
1961					
Jan.	838	771	1,075	842	1,068
Feb.	829	755	1,077	835	1,012
Mar.	833	750	1,076	830	1,013
Apr.	845	762	1,081	827	1,018
May	877	788	1,082	837	1,059
June	898	801	1,079	844	1,064
July	899	789	1,070	836	1,050
Aug.	919	809	1,072	864	952

U. S. Bureau of Labor Statistics.

Some Industries Still Lag

Despite the assurances that the economy is securely on the uptrend, even that durable goods will outpace the general business, there is the nagging feeling that metalworking is still behind the general trend. And industry statistics don't do much to dispel the feeling. While there has been scattered improvement, several major sectors of metalworking are still far from record levels.

New orders for all types of machine tools in August ($56 million) showed no substantial improvement over July's. Thanks to comparatively good months in March and June, new orders for the first eight months of the year are 6 per cent ahead of the corresponding total for 1960, a year not noted for its strength in machine tools. Shipments in August totaled $47.95 million, down slightly from July's, the National Machine Tool Builders' Association reports. Foreign orders continue to be the strongest feature of the business.

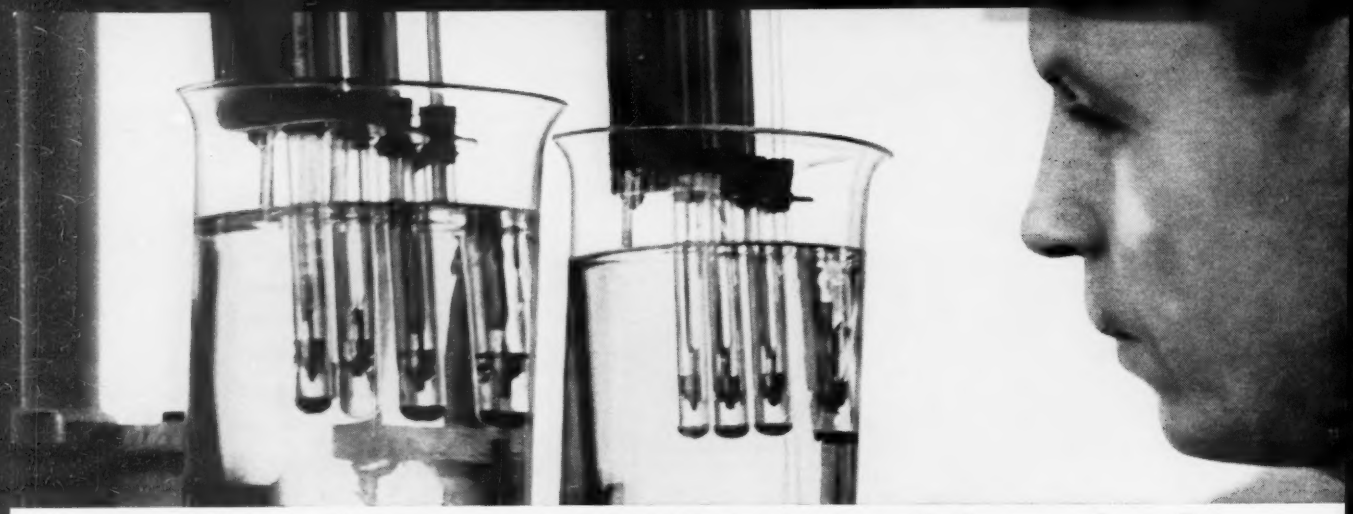
Sales of used machine tools in August jumped to 105.7 per cent of the 1957 base, about equal to last year's corresponding figure, says the Machinery Dealers National Association. But it cannot be considered a trend because of an up-and-down pattern that dates back to late 1960.

Orders for railroad freight cars fell below the yearly average in August. (See table, Page 42.) They also fell 1000 cars short of deliveries, bringing another decline in backlogs. Data from the American Railway Car Institute show that unfilled orders are below the 10,000 unit mark for the first time in many years. If the rate of decline continues, there will be no backlog by mid-1962.

Despite an improvement over July, the August new order total of $5,759,000 for industrial furnaces fell short of the August, 1960, figure. Volume for the first eight months of 1961 still lags the year-ago period by 7 per cent, reports the Industrial Heating Equipment Association. Induction heating equipment orders lag the year-ago pace by 24 per cent.

One of the more encouraging reports comes from the National Industrial Distributors' Association. Member sales in August were up 16.7 per cent from July's and 4.3 per cent from the year-ago period. But the cumulative total is 7.1 per cent below the 1960 figure.

THE 52100 HOUSE
INDUCTION • CONSUMABLE • LEADED
PETERSON STEELS, INC.
Union, N. J. • Wethersfield, Conn.
Detroit, Mich. • Melrose Park, Ill.



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

*Registered Trademark

SHELL

A BULLETIN FROM SHELL
–where 1,997 scientists are helping to provide better products for industry

LEONARD W. MAWHINNEY
M&T vice president

JULIUS A. RIEDL
AMC-Automotive Div. post

E. ROBERT CARPENTER
Hydreco gen. sales mgr.

LYNN H. RANSOM
Republic purchasing

Leonard W. Mawhinney was named a vice president of **Metal & Thermit Corp.**, New York. He joined M&T in 1959 as executive adviser to the president, and continues with corporate planning and control.

Julius A. Riedl was made assistant manager of manufacturing for **American Motors Corp.'s** Automotive Div., Detroit. Former works manager of the Milwaukee body plant, he is succeeded by **William F. Poupard.**

K. R. Beardslee, who retired last spring from General Electric Co., after serving as president of Carboloy Co. and later general manager, Metallurgical Products Dept., has joined **Dawson Carbide Industries**, Detroit, and its affiliate, Harrisville Tool Co., Harrisville, Mich.

William J. Kerr was made vice president of development, **Yoder Co.**, Cleveland. He was vice president-production. **Charles J. Lantz** was made director of production.

E. Robert Carpenter was made general sales manager, **Hydreco Div.**, Kalamazoo, Mich., New York Air Brake Co. He has been in Europe for the last eight months in connection with the company's overseas operation.

Lawrence Ennis was made purchasing agent, **Anti-Corrosive Metal Products Co.**, Castleton-on-Hudson, N. Y. He replaces **Frank Legnard**, made general manager.

Ralph E. Arnold was named manager of the Canonsburg, Pa., plant of **Fort Pitt Bridge Works.**

Walter R. Naas was appointed director of foreign sales for **Buhr Machine Tool Co.**, Ann Arbor, Mich. He will establish offices in Switzerland.

Henry J. Miller was named president and chief executive officer, **Hoefer Mfg. Co.**, Freeport, Ill. He was operations manager, Micronics Div., Elgin Watch Co.

Lynn H. Ransom was made manager of purchases and raw materials of **Republic Steel Corp.**, Cleveland. He succeeds the late **W. T. Adams.** Mr. Ransom was assistant manager of purchases.

L. Earl Harpst fills the new post of director of overseas manufacturing for **Willys Motors Inc.**, Toledo, Ohio.

Raymond W. Whelan was made chief engineer, Industrial Products Div., Belmont, Calif., Works of **Western Gear Corp. H. E. Haseleu** was named sales manager-defense industries for the division; **James B. Post** sales manager - engineered products.

Ira G. Cruckshank fills the new post of manager of engineering, Stanley Steel Strapping Div., **Stanley Works**, New Britain, Conn.; and **Donald T. Armington** to the new post of chief field engineer. **W. H. Wishart** was made sales manager, **Leslie H. Gillette** marketing man-

WILLIAM J. KERR
Yoder v. p.-development

WALTER R. NAAS
Buhr foreign sales dir.

HENRY J. MILLER
Hoefer Mfg. president

IRA G. CRUCKSHANK
Stanley div. eng. mgr.

RICHARD E. McCOACH
joins American Hoist

CARTER H. GRAY
Kaiser Steel mill supt.

J. E. WILSON
Erie Foundry gen. sales mgr.

ager for industrial hardware, Stanley Works.

Richard E. McCoach joined **American Hoist & Derrick Co.**, St. Paul, as manager of industrial sales. He was general sales manager, Industrial Brownhoist Corp.

Bruce Otis was made assistant to the president, **Black-Clawson Co.**, New York, responsible for administrative functions of its international operations.

Gordon D. Skinner, vice president of **Luria Bros. & Co. Inc.**, New York, was made assistant regional vice president, assisting **R. E. Schroeder.** Mr. Skinner remains in charge of the Detroit office, and continues headquarters there.

Keith P. Mazurek was made general manager, Export - Import Div., **Chrysler Corp.**, Detroit.

Glen E. Sigman was appointed vice president-industrial relations for **McLouth Steel Corp.**, Detroit.

Carter H. Gray was made superintendent of the continuous weld pipe mill at **Kaiser Steel Corp.'s** Fontana, Calif., plant. He was assistant superintendent.

J. E. Wilson was named general sales manager, **Erie Foundry Co.**, Erie, Pa. He was with General Electric Co. in Erie.

Robert J. Buckley was made assistant general manager, **Standard Steel Div.**, Burnham, Pa., Baldwin-Lima-Hamilton Corp.

William H. McDonald Jr. was made assistant manager of sales, Sheet & Strip Div., **Republic Steel Corp.**, Cleveland.

Theodore S. Strojny was appointed manager of **Bay State Abrasive Products Co.'s** new subsidiary, Bay State Abrasives S. A., Luxembourg.

Paul Jones was appointed general manager, Hastings, Mich., Div. of **E. W. Bliss Co.**, succeeding **Robert Shannon**, who will serve as a consultant. Mr. Jones was division factory manager.

G. Wayne Cartier was made director of product development for **Branford Co.**, New Britain, Conn., division of Electro-Mechanics Inc.

Francis J. Borowsky was elected president of **George K. Garrett Co. Inc.**, Philadelphia.

Darwyn I. Brown was made president, **Seaway Steel Div.**, Roblin-Seaway Industries Inc., North Tonawanda, N. Y. He was manager of product development of Washington Steel Corp.

Chester J. Quinlan was made purchasing agent for body parts at **Chrysler Corp.**, Detroit. He was manager of purchasing for the Power Train Group.

Roy L. Ash was elected president of **Litton Industries Inc.**, Beverly Hills, Calif.

C. H. King, vice president, formerly in charge of engineering and sales for **Clark Equipment Co.'s** Automotive Div., Jackson, Mich., was named to the new post of staff officer of the company, with corporate-wide responsibilities for engineering and related technical activities. He is succeeded as head of engineering and sales-Automotive Div. by **Ronald H. Bolster**, former division chief engineer.

John E. McIntyre, former vice president-general manager, was elected president of **Sibley Machine & Foundry Corp.**, South Bend, Ind. He succeeds **Bernard J. Voll**, now chairman. **William H. Voll** was elected vice president-sales.

GLEN E. SIGMAN
McLouth Steel v. p.

THEODORE S. STROJNY
Bay State Abrasives post

PAUL JONES
Bliss-Hastings gen. mgr.

JOHN E. McINTYRE
Sibley Machine president

Edwin F. Lord was made product sales manager, Wire Dept., **Wickwire Spencer Steel Div.**, Colorado Fuel & Iron Corp., New York. He succeeds **R. M. Wagner**, who continues as product sales manager, Pig Iron & Semifinished Steel Dept.

James E. Duff, former general sales manager of Joy Mfg. Co.'s Electrical Products Div. in St. Louis, was elected vice president-marketing, **Cuno Engineering Corp.**, Meriden, Conn., a subsidiary of American Machine & Foundry Co.

John M. Dumser joined **Bridgeport Brass Co.**, Bridgeport, Conn., division of National Distillers & Chemical Corp., as assistant to the president. He was marketing director at Wolverine Tube Div., Calumet & Hecla Inc.

Standard Tool & Mfg. Co., Lyndhurst, N. J., named **Z. E. Zilahy** director of its Contract Engineering Div.

David W. Boyd was elected president and chief administrative officer of **Engineering Castings Inc.**, Marshall, Mich. **Kenneth W. Rhoads** was elected chairman and chief executive officer. **Albert E. Rhoads**, former president and chief executive officer, has relinquished executive management of the firm, but remains a director and will continue in a consulting and advisory capacity.

Chester F. Buckley, president, Standard Transformer Co., Warren, Ohio, was named president of **Improved Seamless Wire Co.**, Providence, R. I., and **Vincent W. Makin** was made vice president-general manager. The capital stock of Improved Seamless Wire was recently acquired by Laminated Metals Inc. All three firms are now affiliates of American Gage & Machine Co. Mr. Buckley is also a vice president of American Gage.

The Automotive Div. of **Budd Co.**, Detroit, named **Paul G. Hykes** executive engineer-brakes; and **Roy C. Norton** executive engineer-wheels.

Emerson P. DePuy was assigned to the West Coast offices of **Pittsburgh-Des Moines Steel Co.** With headquarters in Santa Clara, Calif., he will handle industrial sales throughout the California area.

EDWIN F. LORD
Wickwire-Wire Dept. post

JAMES E. DUFF
Cuno marketing v. p.

JOHN M. DUMSER
joins Bridgeport Brass

LEROY CAMEL
Detrex Chemical v. p.

JOHN W. THORNTON
Joy Mfg. div. v. p.

EDWARD F. KARNES
Hassall v. p.

Leroy Camel was elected vice president, **Detrex Chemical Industries Inc.**, Detroit. He is sales manager, Chemical Processing Div.

John W. Thornton was elected vice president and general manager, Industrial Div., **Joy Mfg. Co.**, Pittsburgh. He was vice president-marketing.

Max M. Wertheim joined **Norbatrol Electronics Corp.**, Pittsburgh, as chief development engineer. He was with Magnetic Amplifiers Div., Siegler Corp.

Fred W. Elliott was elected executive vice president, **Michigan Chemical Corp.**, St. Louis, Mich. He was group vice president of H. K. Porter Company Inc.

John R. Mueller was made managing director of **Morse Chain Div.**, Borg-Warner Ltd., English subsidiary of Borg-Warner Corp.

John Caputo was made vice president-sales, **Norwalk Powdered Metals Inc.**, Norwalk, Conn.

Edward F. Karnes, sales manager, was elected vice president-sales, **John Hassall Inc.**, Westbury, N. Y.

OBITUARIES...

Sigmund Waldes, 83, president and chairman, **Waldes Kohinoor Inc.**, Long Island City, N. Y., died Sept. 18.

Dr. Oswald Kolbert, 62, technical director, **Waldes Kohinoor Inc.**, Long Island City, N. Y., died Sept. 20.

Charles E. Wilson, 71, former president of **General Motors Corp.**, and former secretary of defense, died Sept. 26.

Clyde J. Townsend, 65, procurement manager, **Hobart Mfg. Co.**, Troy, Ohio, died Sept. 13.

Paul J. Dooley, 58, president, **Manufacturers Enameling Corp.**, Toledo, Ohio, died Sept. 18.

H. Stanley Rogers, chairman, **American Shear Knife Co.**, Homestead, Pa., died Sept. 8.

An automatic coiler forms .063 Johnson tinned music spring wire into an automobile brake cylinder spring. Because this spring will spend its life in a bath of corrosive brake fluid it needs a heavy, uniform tin plating that will not peel, crack or flake. It is a critical spring with 12½ coils, held to tight tolerances and coiled with two different end sizes. The larger end is 1.034 inches while the smaller end is .710 inch.

Mid-Continent Spring Company of Ky. says . . .

Dependable Johnson Music Spring Wire Gives Precision Springs Reliability

Dependable quality and quick service are two major reasons Johnson wire is specified in Kentucky spring plant

"After 23 years in the spring manufacturing business, I'll give you my one-word description of Johnson Steel & Wire Company's spring wire . . .

"It's DEPENDABLE."

So says L. B. Langhi, president of Mid-Continent Spring Company of Ky.

And that goes for Johnson's high carbon wire destined for springs that snap into action at the critical moment of a missile launching or simply make a baby doll wink, as Mr. Langhi explains.

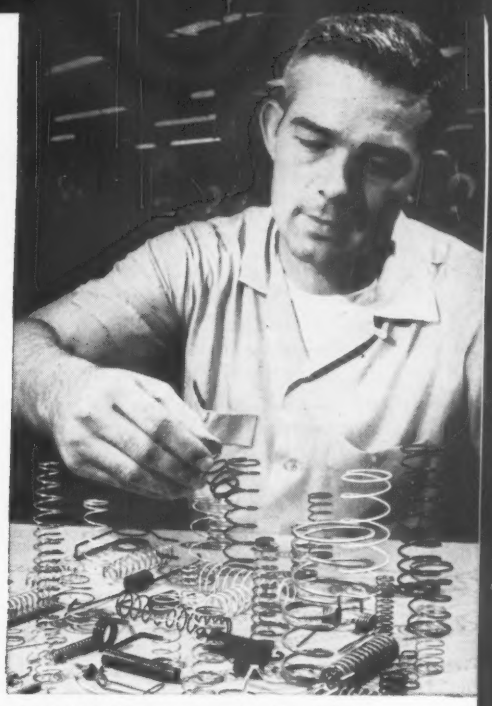
Regardless of their job, it's vitally important to Mid-Continent's customers that springs function with precision. So the firm's plant at Hopkinsville, Ky., builds reliability into all its products, whether for space flights, toys, automotive and electrical parts or vending machines.

This reliability depends as much upon the raw materials of the springs —music spring wire or oil tempered spring wire—as it does upon the skills of Mid-Continent's spring makers.

Mr. Langhi said: "Because our customers depend upon our springs to give them a full measure of value, we demand and get wire from Johnson that has a uniform quality in finish, temper, size and physical properties.

"Coatings on Johnson tin-coated

A carburetor control extension spring must be held to unvarying tolerances to insure consistent performance. This important spring is made of Johnson .010 tinned music spring wire, has an O.D. of .118 inch and measures ¾ inch outside the loops.



R. M. Worthman, purchasing agent for Mid-Continent Spring examines some of the one thousand different type springs manufactured at Mid-Continent.

This tiny vending machine extension spring is made of Johnson .013 tinned music spring wire, has .158 I.D. and 22 turns.

music spring wire are both uniform and adherent. This eliminates peeling, cracking or flaking during our coiling operation."

High physical properties, uniform cast and smooth surfaces are other important requirements since Mid-Continent springs must form within strict dimensions and carry precise work loads.

At Mid-Continent, accuracy of wire dimensions greatly affects spring coiling and performance. Close tolerances on dimensions are met consistently in fine wire specialties produced by Johnson Steel & Wire Company.

"Our production averages over a million springs per day," said R. M. Worthman, purchasing agent for Mid-Continent Spring.

"Because of this, we keep our warehouse stocked with at least 300 tons of wire. Johnson supplies us with a range of .008-inch to .207-inch music spring wire and oil tempered wire.

"Whenever our wire stock begins to deplete, we're able to call for and get fast delivery service from Johnson's mill in Worcester or from its warehouses in Chicago or Akron.

"Of the 64 different types of brake drum springs we manufacture, 90 percent of them are made of Johnson wire. That's what we think of Johnson Steel's wire."

Let Johnson start today to help you with your high carbon spring wire needs.

Just call the nearest district sales office and talk with a Johnson representative. He's ready to help you with whatever your wire and spring problems might be—right now.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

Steel

Canada Reviews Tariffs on Machinery

CANADIAN steel producers are urging the tariff board at Ottawa, Ont., to continue free entry or low rates on machinery and equipment that must be imported by primary industries. They contend: If the rates are "unduly enhanced," the tariff protection gained by Canadian machinery builders will be outweighed by the risk of higher prices on their products and higher steel costs.

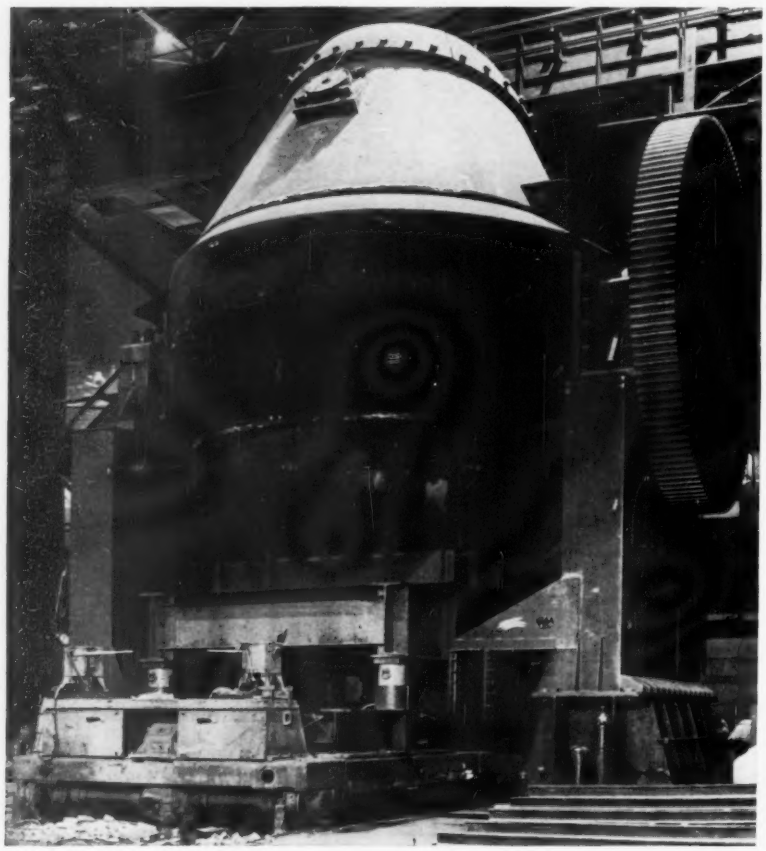
Companies that endorse the argument include: Algoma Steel Corp. Ltd., Atlas Steels Ltd., Dominion Foundries & Steel Ltd., Dominion Steel & Coal Corp. Ltd., and the Steel Co. of Canada Ltd.

End-use tariff provisions were designed to keep down production costs by allowing primary industries, such as mining, agriculture, fishing, and forestry, to import their capital equipment free of duty or at special, low rates.

Provisions covering machinery and equipment for mining were introduced in 1930, and no fundamental change has been made in them.

The government has asked the tariff board to review the items.

Complete or partial deletion of the tariff provisions has been sought by the Canadian Electrical Manufacturers Association, the Machinery & Equipment Manufacturers Association of Canada, and some domestic suppliers of capital equipment not represented by these organizations.



Oxygen Furnace Installed in 12 Days

ONLY 12 days were required to install this oxygen steelmaking furnace at Dominion Foundries & Steel Ltd. (Hamilton, Ont.). The unit weighs about 340 tons, has a capacity of 105 tons. Horton Steel Works Ltd. (a subsidiary of Chicago Bridge & Iron Co., Chicago) prepared the old furnace for removal the day after full capacity operation was halted. They took out mechanisms, platforms, drives, and other auxiliary equipment before they removed the old furnace, which weighed about 115 tons. The new unit was prepared, moved into position, and leveled within 0.005 in.

SKF Forms New Division

SKF Industries Inc., Philadelphia, has formed an Automotive Products Div. to make a line of ball bearings, tapered roller bearings, clutch throwout bearings, cylindrical rolled bearings, and seals. E. C. McGinley is manager.

Bohn Aluminum Builds

Bohn Aluminum & Brass Corp., Detroit, is building a 10,000 sq ft addition to the plant of its Danville (Ill.) Div. The division makes heat transfer equipment for heating, air conditioning, and commercial refrigeration. H. B. Thomas is vice president of Bohn and general manager of the Danville operation.

Technical Center Opened

Continental Can Co., New York, officially opened its $20 million packaging research complex in Chicago and Plainfield, Ill. The Technical Center consolidates research activities for all but one of Continental's product divisions in proximity to each other and to the long range research operation at Central Research & Engineering.

Operating in the Technical Center are the General Packaging Research & Development Laboratory, located next to the previously established Metal Research & Development and Central Research & Engineering facilities; and the Glass

Research & Development Laboratory, Plainfield, Ill.

The four buildings making up the Technical Center house some 800 scientists and technicians in an area covering 553,000 sq ft, or nearly 13 acres of research facilities.

Buys Vacuum Arc Furnace

Special Metals Inc., New Hartford, N. Y., a producer of vacuum melted superalloys, will install a vacuum arc furace with unique design features (its crucible design is similar to that of a Lazy Susan which allows ingot removal by rotation of the crucible). The contract for construction and installation (about $500,000) was awarded to Consolidated Vacuum Corp., Rochester, N. Y. The furnace will be built in Hanau, Germany, at the facilities of W. C. Heraeus GmbH.

Fagersta Steels Builds

Fagersta Steels Inc. is erecting national headquarters at West Caldwell, N. J. The firm is one of the largest steel producers in Sweden and a major manufacturer of specialty steels. Office will be moved from New York during December.

Reynolds Plans Expansion

Reynolds Metals Co., Richmond, Va., plans to expand its Longview, Wash., reduction plant. New equipment will include two holding furnaces and a vertical direct casting machine which will produce 5000 lb ingots. The new equipment will be built in the plant's casthouse—a $700,000 addition to it was dedicated Sept. 15. The addition contains three new furnaces, a horizontal casting machine, sawing equipment, and aluminum homogenizing facilities.

National Tool Buys Plant

National Tool & Die Inc. acquired a plant at 1130 W. Grand Blvd., Detroit, where die construction facilities are available for automotive dies, jigs, and fixtures. The firm expects to install additional equipment for tryout of large body dies. Officers of the company include C. W. Bissell, president, and John Cox, vice president and general manager.

Plans Cutting Tool Center

Threadwell Tap & Die Co. is constructing the first units of a Cutting Tool Center in Greenfield, Mass. The first unit will consist of a 65,000 sq ft office and plant which will house the firm's tap, die, keyway broach, and gage manufacturing operations. Threadwell's Conway Mfg. Div. will also be incorporated in the facility. Plans call for expansion of the center to provide for Threadwell's Cogsdill Twist Drill Div. in addition to other operations.

Big Engine Plant Opened

Allis-Chalmers Mfg. Co., Milwaukee, has started production in its 515,000 sq ft engine manufacturing facility at its Harvey (Ill.) Works. The plant has four semiautomatic assembly lines which are capable of producing more than 130 different variations of four and six cylinder diesel, gasoline, butane, and other engines. A fifth line is manually controlled for production of engine drive electric sets, power units, marine engines, and special industrial engines. More than 600 machine tools have been installed in the new plant, including more than 200 completely new units.

NEW ADDRESSES

A. F. Holden Co. moved its headquarters to a new plant at 2195 S. Milford Rd., Milford, Mich. Among the firm's products are industrial, electrode, and pot furnaces; salt bath conveyors; and salt baths.

Automation Industries Inc. moved its corporate offices and Ultrasonics Div. to a 45,000 sq ft facility in Torrance, Calif. The firm has 130,000 sq ft of additional plant space at Manhattan Beach, Calif.; Tulsa, Okla.; Abilene, Tex.; Boulder, Colo.; and Columbus, Ohio.

All administrative, purchasing, manufacturing, warehousing, and shipping operations of **Curtis Industries Inc.** have been centralized in the company's new headquarters on Curtis Boulevard, Eastlake, Ohio. The company makes key blanks and key cutting equipment and is a distributor of small automotive parts, fasteners, and other hardware specialties.

Hancock Telecontrol Corp. transferred its executive offices to 320 Park Ave., New York 22, N. Y., from Jackson, Mich. The company makes data processing systems.

CONSOLIDATIONS

TKM Electric Corp., Rochester, N. Y., and **Drake Mfg. Co.**, Friendship, N. Y., have combined to form Dynamic Electronics Inc. Negotiations are underway to acquire a third company in a related field. TKM makes permanent magnet generators for the missile and aircraft industries and is introducing a portable power generator. Drake makes castings for generators.

Diamond Alkali Co., Cleveland, acquired **Fiber Chemical Corp.**, Cliffwood, N. J., producer of organic chemicals and inorganic specialties. A. B. Tillman, Diamond's general manager, Soda Products-Chrome Div., has been elected president of the new subsidiary. Fiber Chemical's facilities will be operated as a part of that division. Other officers include: G. V. Du Pont, vice president; and R. H. Armor, secretary-treasurer.

NEW OFFICES

Ajax Magnethermic Corp., Youngstown, opened a regional sales office at 3224 Peachtree Rd. N.E., Atlanta, Ga. A. B. Flury is in charge.

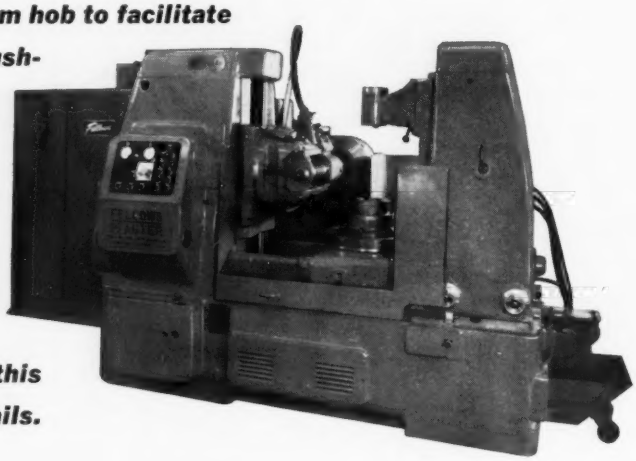
Fabricated Products Div., West Newton, Pa., **Townsend Co.**, established a branch office and warehouse at 805 S. Grand Ave., Santa Ana, Calif.

Huck Mfg. Co., Detroit, opened sales offices at 3305 E. Douglas Ave., Wichita, Kans., and at 500 Wall St., Seattle, Wash. The company supplies blind rivets, blind bolts, patented Huckbolt fasteners, and installation tools for aircraft, missiles, automotive, marine construction, and electronic equipment.

NOW... A Larger Capacity FELLOWS-PFAUTER High-Speed Hobbing Machine... The P 630

You get all the advanced-design features of the production-proved P 400 Fellows-Pfauter hobbing machine — plus extra work capacity — with this new Model P 630. Takes work up to 25″ diameter. Maximum face width at 25″ diameter is 16¼″. Maximum diametral pitch in steel is 3.

Work area is readily accessible for setup and loading, and table retracts automatically from hob to facilitate work changes. Hob shifting is by push-button. It's solid too, with rugged hob head and double wall construction column and bed, and heavy V-ways. Table is as large as maximum workpiece diameter — work column of massive design.



Reduce your production costs with this new Fellows-Pfauter. Write for details.

NEW . . . Dictionary of Change-Gear Combinations

"Fellows-Pfauter Change Gear Tables" by F. Becher and A. Koerner eliminates tedious calculations and trial-and-error methods. Gives combinations for more than 26,000 ratios carried to six decimal places from .100,000 to 1.000,000, with greatest step approximately .00005. Gears in range of 18 to 80 teeth mainly used. Examples are given. Only $8.00. Order from THE FELLOWS GEAR SHAPER COMPANY, 78 River St., Springfield, Vermont, U.S.A.

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Gear Production Equipment

Technical Outlook

BUILDS SUPERMAGNET— A 1 lb magnet announced by Westinghouse Electric Corp., Pittsburgh, is about the size of a doughnut, develops 43,000 gauss. A comparable iron magnet would require a 20 ton chunk of iron as big as an auto. The device must be operated at supercold temperatures and will make possible many experiments which could bring cheaper electrical power, the firm says. (See Page 64.)

VULCANIZE SHEET TO FOIL—Household stove and counter mats introduced by Rubbermaid Inc., Wooster, Ohio, feature vulcanized aluminum foil on rubber. Developed by Reynolds Metals Co., Richmond, Va., the process is probably inexpensive (a typical 16 in. by 20 in. mat sells for $3.98). The aluminum quickly dissipates heat, says Rubbermaid. Pads ordinarily stand boiling water and dry temperatures to 300° F.

MOBILE LOUNGE—To accommodate passengers at the new Washington airport, Budd Co. built prototype bus lounges 54 ft long, 17 ft high, 15 ft wide. Capacity: 90. They will carry passengers to and from plane parking areas and the terminal. Chrysler Corp., Detroit, is testing the stainless sheathed vehicles for Federal Aviation Agency.

FRICTION WELDER OFFERED—The idea of friction heat for buttwelding has become practical enough to enable one firm (American Machine & Foundry Co., New York) to offer a production model. Price: $25,000. It can handle a 1½ in. solid bar of SAE 1020 steel. The machine will be exhibited at the Metal Show, Oct. 23, in Detroit.

TO PROBE ATOMIC 'GLUE'—Checks run on a relatively small cyclotron have proved the feasibility of a 1 billion electron volt, proton cyclotron. When constructed, such a device would match or exceed the largest counterparts at Berkeley, Calif.; Geneva, Switzerland; or Moscow, USSR, claim J. A. Martin and J. E. Mann, Oak Ridge National Laboratory, Oak Ridge, Tenn. Advantage: The beam would be continuous with an effect (beam intensity) 10,000 times greater than giant, ring-type synchotrons. The machine will advance study of mesons which are believed to hold atoms together.

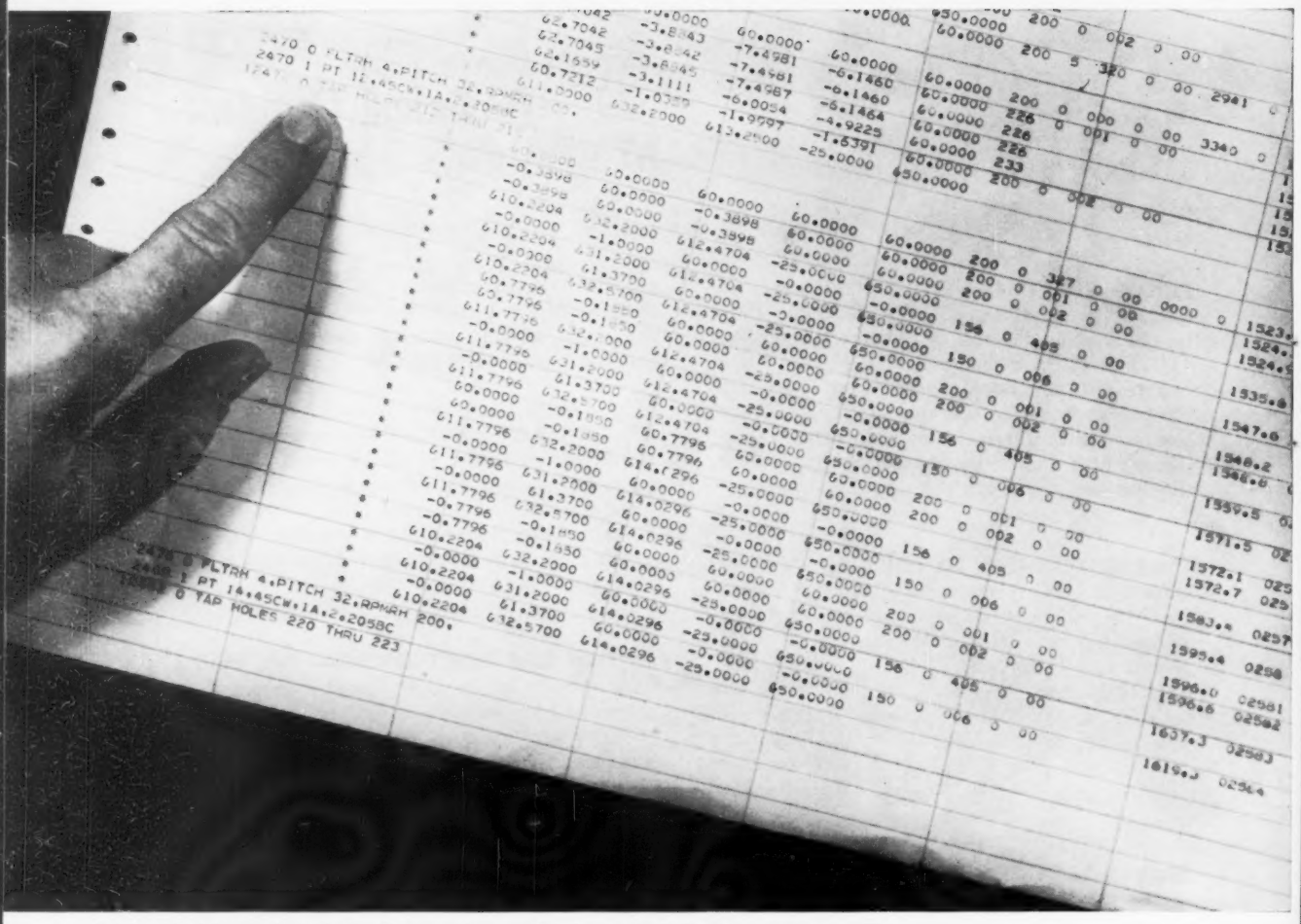
NO-CONTACT SWITCHES—Current developments in transistors enable experts to predict early development of contactless switches for automatic handling equipment (fork trucks, for example). The statement was made at an SAE meeting by O. S. Carliss, New York, engineering manager, Yale & Towne Mfg. Co.

BRITISH LIKE ELECTROSLAG— Two vertical welding units are being employed to join sections of caissons for an offshore drilling rig. Each section, 8 ft high, is made of 1.875 in. plates. Units automatically weld about ⅞ in. a minute or 4 ft an hour. About 70 lb of metal per joint is needed, says *Welding & Metal Fabrication.*

TOMORROW'S INSTANT LAUNDRY—Experimental work by Stanford Research Institute, Menlo Park, Calif., covering three years has culminated in a commercial unit that can wash and dry a bed sheet in 6 seconds. It's the forerunner of a completely automatic, 11 step process: Loading, mark reading, inspecting, spotting, washing, extracting, drying, ironing, folding, sorting, and bundling.

NICKEL SETS SILVER PLATE— An electrolytic copper part for General Dynamics/Astronautics Div., Azusa, Calif., General Dynamics Corp., had a tendency to lose its silver plate when soldered. Solution: A thin layer of nickel under the silver. Extensive work is being pushed on silver brazing to replace soldering.

STUDY 'GROUND EFFECTS' SHIPS— The Maritime Administration has awarded $370,000 to Douglas Aircraft Co., Santa Monica, Calif., to design vehicles that ride on a "bubble" of air. Included will be ships weighing from 50 to 200 tons. Object: Full size ocean vessels, including aircraft carriers, which will travel at 100 knots.



Brief, coded instructions (index finger points to them) are made by the programer. The other calculations are based on the instructions, but they're made by a computer. The difference in quantity shows how much the computer does

• SOMEDAY, a numerical control programer may decide what the machine tool ought to do, then give the instructions to an understanding control system.

Undoubtedly, that's still some years off. But computers are bringing it closer by bypassing many tedious calculations in programing. The Aerospace Industries Association is refining its APT system. Several computer makers have come up with systems of their own.

One of the simplest is in operation at Sundstrand Corp., Rockford, Ill., where it's used by divisions to slash programing complexity and time.

• Split programing approaches the ideal with a simple code language that the computer translates into control tape data.

The key to the Split (Sundstrand Processing Language Internally Translated) system is a deck of IBM cards that feeds numerical control setup data into an IBM 1620, low cost computer. The computer stores the information in its memory maze. From then on, the computer can translate Split instructions into a complete tape control program in one pass, and it's self-checking.

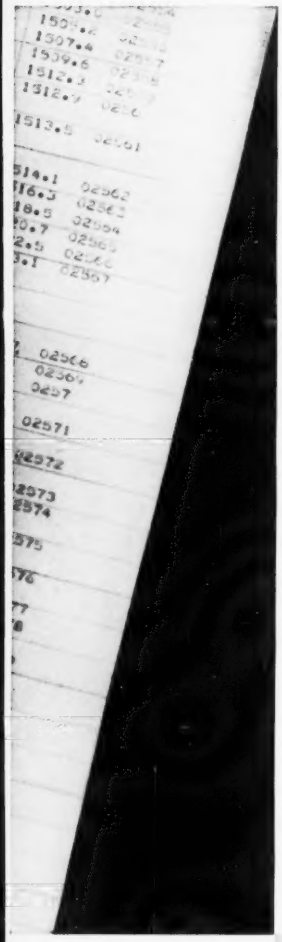
Sundstrand management reports that the Split system has slashed programing time on some jobs by as much as 90 per cent. Other advantages: Programing cost is down. Inaccuracies that go with countless manual calculations are gone. Leadtime on important parts is reduced. And since the system does not require co-ordinate drawings (although it can be used with them), there is no need to redimension drawings.

Flexibility permits the system to be used with General Electric, Thompson Ramo Wooldridge, or Bendix controls.

• With a combination of 14 major and 36 minor operations, the programer defines the job to be done.

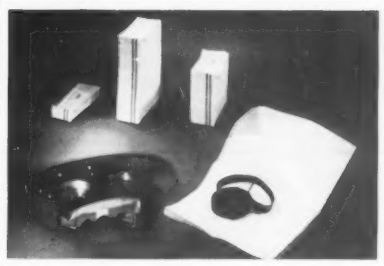
Major instructions include those for automatic tool change, cut (along a prescribed path), move (from one point to another, but path not prescribed), contour (along the circumference of a prescribed circle), drill, bore, and float tap.

Minor instructions include feed and speed, depth, direction (plus or minus on axis or clockwise or counterclockwise on circles), and coolant on or off. The code sys-

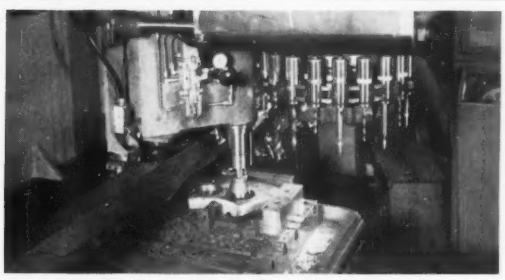


A Computer Helps Sundstrand Get More from Numerical Control

Computer programing: 6 hours
Manual programing: 24 hours
The programer's statements are punched into cards (left stack). They are then run through a computer to get a set of cards with all statements, comments, absolute, and incremental values. The printout sheet, right foreground, is a record of that deck. A card sort picks the incremental values only, and they are used to make the control tape. The two blend bores are contoured with an end mill.



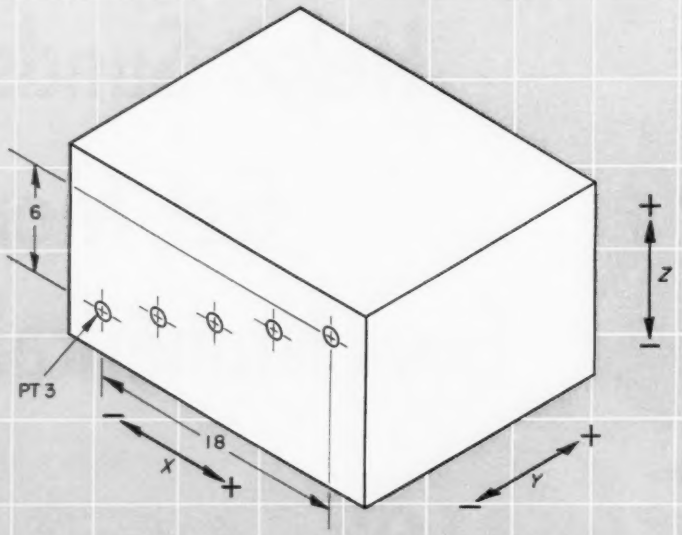
120 programer's statements tell this machine how to make a finished part from blank



How the Computer Saves Time

To drill this angular row of holes, the programer writes:

DRL5, 6LZ, 18LX, 1.8A, 4IPM, PT3



Translation: Drill five equally spaced holes, on a line on which the last hole is 6 in. up on the Z axis, 18 in. over on the X axis. Drill 1.8 in. deep at 4 in. a minute feed. Begin at previously defined point 3. (The computer calculates the position for each hole.)

tem also includes some shortcuts. For example, if a point on the part is to be used several times during the program, the three-axis (or five axis) position of that point can be listed, then the instruction given: DPT 3. From then on, PT 3 tells the machine where to go, and the axis positions need not be given again. As many as 70 of these points can be defined and retained.

Further, when the programer instructs the machine to go to a predefined point, he doesn't need to compensate for differences in tool lengths. The statement ATCHS (for automatic tool change) has incorporated in it the gage length of the tool. The computer remembers the length of each tool and compensates for it.

Another shortcut: If you have to drill equally spaced holes in a bolt circle, you don't define the axis positions of each hole. You define the point at the center of the circle, the circle diameter, the radial location of the first hole to be drilled (0 degrees is always at the 3 o'clock position), and the direction (clockwise or counterclockwise) the other holes are to be drilled from the starting hole.

Take this statement: DRL 8, PT 16, 4.5 BC, 0 CW, .9 A, 6 IPM.

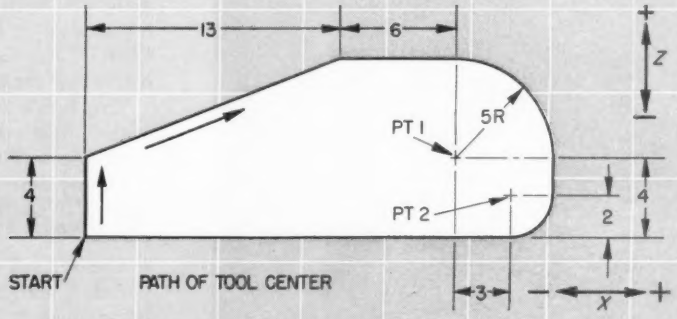
It translates: Drill eight equally spaced holes, around point 16 on a 4½ in. diameter bolt circle; the first hole is at the zero position (3 o'clock); then move clockwise to the other holes; drill to a depth of 0.9 in. at a feed rate of 6 in. a minute.

If the statement had started out "DRL 30," the instruction would be for 30 equally spaced holes around the same bolt circle.

By letting the computer do the calculating, and by taking advantage of coding shortcuts, the programers at Sundstrand are getting

To contour this shape, the programer says:

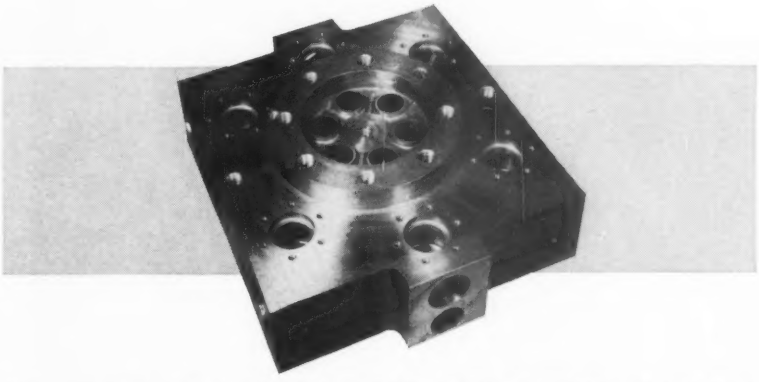
1. Cut, 4Z, 10IPM
2. Cut, 5Z, −13X
3. Cut, −6X
4. Cont,90, 270CW, 5R, TOL.002, 5IPM, PT1
5. Cut, −2Z, 10IPM
6. Cont,90, OCW, 2R, TOL.002, 5IPM, PT2
7. Cut, 22X



Translation: Start by cutting 4 in. up the Z axis. Then cut a path that ends 5 in. up on the Z axis and 13 in. over on the X axis. Then cut over 6 in. on the X axis. Then contour the 90 degree arc of a 5 in. circle, beginning at 270 degrees clockwise from the zero-degree point (zero is the 3 o'clock position) at 5 in. a minute. Center of the circle is previously defined point 1. (The tolerance statement tells the computer how many straight line segments to make out of the arc.) Next cut down 2 in. Then contour a second arc. Finally, cut across 22 in. on the X axis.

more out of their tape control than ever before. A. E. Hermanson, general manager of the machine tool division, says: "The code language system and the IBM 1620 computer are a fine numerical control team. This team is capable of making 100,000 calculations a minute and greatly enhances the effectiveness of tape controlled machine tools, such as the Sundstrand Omnimil."

Sundstrand is keeping the basic logic information for its own. But sets of computer setup cards, based on the logic, are being marketed to users of Sundstrand tape control machines.



This complex part requires 18 tools and 150 minutes to machine. It took three weeks to program it manually, plus part redimensioning to the co-ordinate system. Using the computer, it took the programer only 35 hours to do the job, and it took the computer only 30 minutes to complete the calculations

Liquid nitrogen traps,

near perfect vacuums

lead scientists to answers on . . .

How Metals React

• A SPACE scientist recently placed a metal sample in a small chamber, reduced the air pressure to a trillionth of an atmosphere (10^{-9} mm of mercury), then watched odd pits form on the specimen.

What he saw is called metal evaporation, one of the unusual effects of outer space on metals and materials. Such phenomena are being studied at Hughes Aircraft Co., Culver City, Calif., to find answers before we venture into space.

The firm's experiments have revealed these perplexing problems:

- Whole sections of a vehicle can disappear during an extended space voyage if the wrong metal is employed.
- Grease and other lubricants vaporize. A machine that runs smoothly on earth will grind to a halt in space.
- Metals cold weld when they are left in contact for a few days in space. The reason: Molecular attraction. It occurs after all gases and impurities have evaporated.
- Some tough plastics, like vinyl, for example, get brittle and crumble in space. Others, like Teflon, are excellent in such an environment.

• The metal evaporation problem can probably be solved, claims Charles G. Walance, lab manager.

Tests show that anodic coatings can cut evaporation rates 70 times. Gold plating is also effective.

Metals most susceptible to evaporation: Cadmium, zinc, and certain magnesium alloys. As you might expect, heat increases the rate of evaporation in a high vacuum of space. Iron and steel will last for years in space. Titanium, tungsten, and platinum are among the best materials.

Another problem: Metal evaporation can lead to plating which is similar to regular metallizing in a vacuum. Deposits on an electronic circuit or an optical system could be disastrous in space.

• A lubricating film must be maintained on bearings throughout the

in Space

life of the space vehicle.

Preventive techniques which show promise:

- Greases with a low vapor pressure evaporate slowly enough to last for one round trip.
- Materials like Teflon don't seize in space.
- Bearings treated with solid lubricants like molybdenum disulfide last for extremely long periods.

Another approach: Maintaining an environment on the bearing surface greater than 10^{-6} mm of mercury with temperatures held below the boiling point of water.

• Cold welding occurs on bearings and electrical contacts, Hughes researchers find.

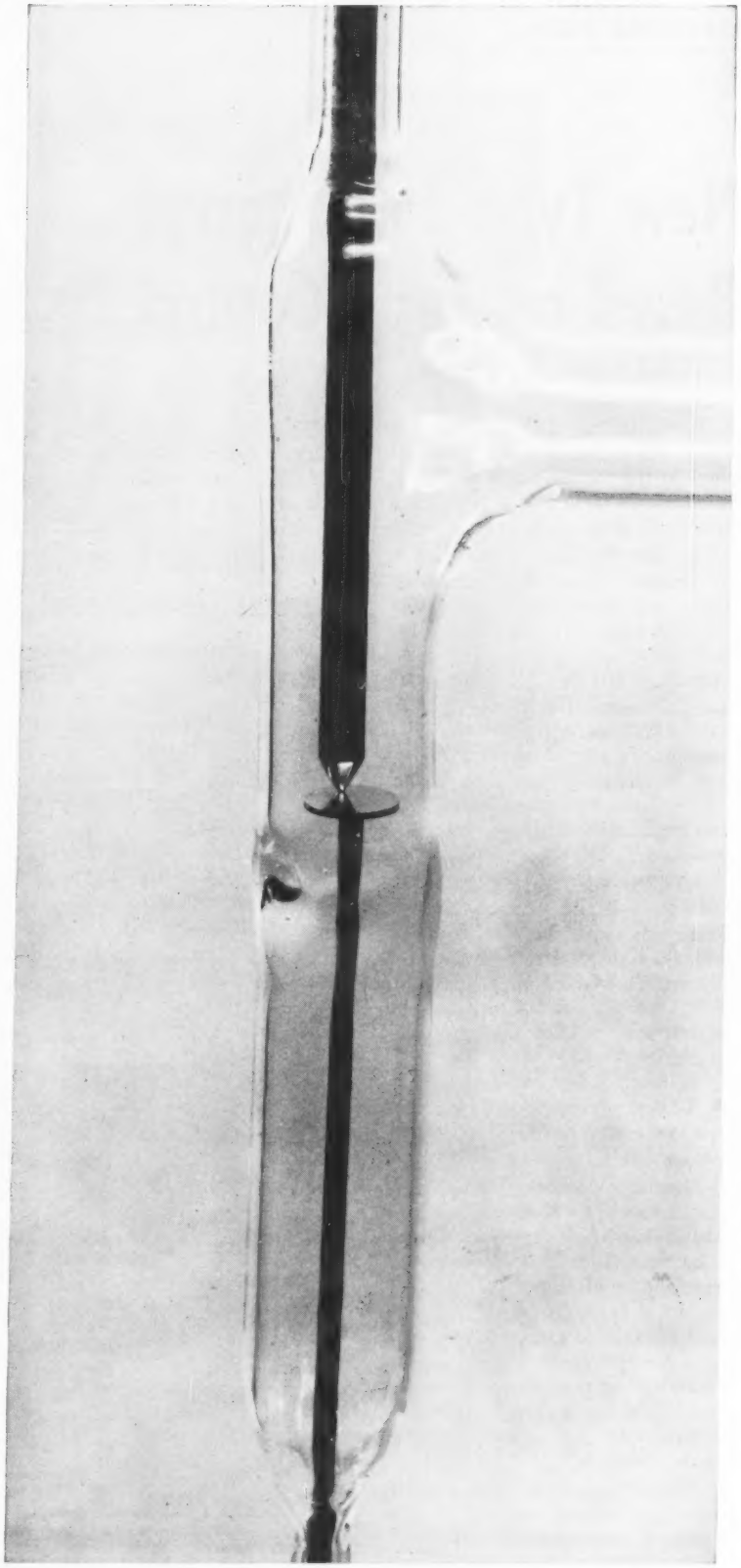
Tests at Hughes have confirmed that friction increases in proportion to the degree metal is degassed. That tends to support the view that friction is due to molecular adhesion.

To test the idea, a pointed rod and a base were degassed in a high vacuum. The rod end and base were heated to 1650° F to completely degas the specimens. After cooling to room temperature, the rod was moved across the base with great difficulty. Finally, seizure occurred. "Junction strength was 45,000 psi, nearly equal to the bulk strength of the rod," states Mr. Walance.

Previous studies have shown that metal surfaces cleaned in air are coated with a film of oxide, water vapor, or other contaminants. Most experiments on friction have been conducted on such surfaces rather than metal itself.

• Space is even more severe than experimental environments, points out Mr. Walance.

Space vacuum is of a larger order than the best vacuums produced (below 10^{-14} mm of mercury). Not only is the pressure less, but there is no obstruction in the path of departing molecules. As surfaces become progressively cleaner, metal vaporization increases. The effect is stimulated by temperature increases.



Cold rolled steel rod and base cold weld perfectly in space, say Hughes scientists. Tensile strength of weld nearly equaled that of the rod

New Type Job Shop Based on Tape Control

• NUMERICAL CONTROL has made room for a new breed of plant in the metalworking industry. It could be called the tape controlled job shop.

The sole function of the shop is to provide customers with parts made on numerically controlled machine tools. The manufacturing philosophy was expressed (STEEL, May 29, p. 80) by Carl Perry, product manager, Industrial Systems Div., Hughes Aircraft Co., El Segundo, Calif. Mr. Perry feels that numerically controlled machines, with automatic tool change and part positioning, are more than machines. They're complete machining centers.

Hughes has a center that Mr. Perry says saves the company some $86,000 a year. A second company, Numerical Machining Co., Cleveland, turns out parts on two Sundstrand numerically controlled machines.

• A Minneapolis company will market low cost versatility for short lot production.

Numeric Machining Inc., Minneapolis, has put a Kearney & Trecker Milwaukee-Matic into production. The company has calculated its machine will give it the edge on two types of jobs. First, it will be able to turn out new products for customers who need small quantities of precision parts rapidly. Second, the company will make a bid for jobs that call for about ten parts a month.

Numeric also will offer a control tape preparation service to other users of numerical control.

On one of its first jobs (complete machining of a business machine frame part), Numeric got the work done in two operations with one holding fixture. The same part used to be machined in 31 setups, with 14 different fixtures.

Some Builders Ease Payment Terms Abroad

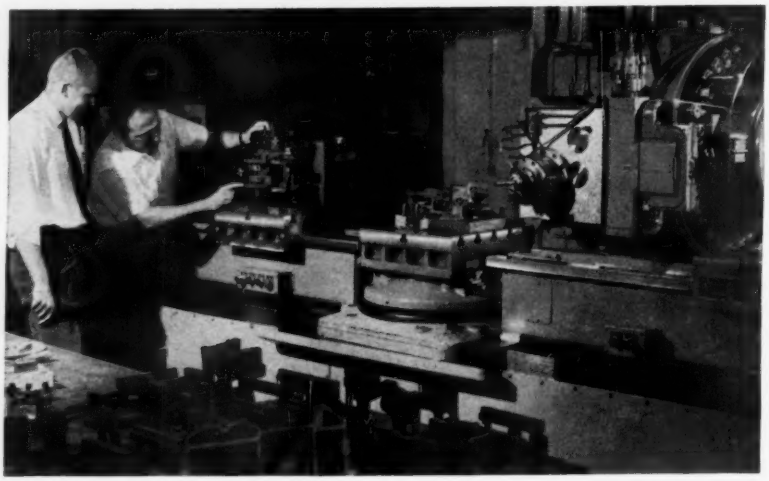
Until recently, a foreign customer frequently had to furnish a letter of credit at the same time he ordered a U. S. made machine tool. The letter was evidence that the funds had been set aside and earmarked for the U. S. builder—to be paid on delivery.

Some builders say they are now foregoing the letter of credit in many cases. Their move makes it possible for the foreign customer to buy U. S. capital goods without tying up his money for a long period, and it may make the payment conditions of U. S. builders more competitive with those of foreign builders.

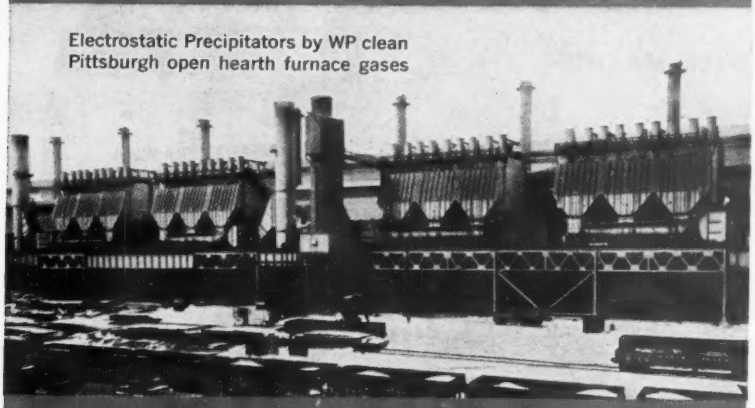
One special machine tool builder says that the technique can assist him in getting orders abroad in a market that's highly competitive. He feels that he must get into the market fast, since our prime advantage (short deliveries) is only temporary.

New in Tape Control

At its recent open house, celebrating its 60th anniversary, National Automatic Tool Co., Richmond, Ind., showed: A new, single spindle, numerically controlled machine with an automatic tool changer capable of handling 32 tools in random selection without tool coding, and a twin spindle, numerically controlled machine with a tool changer for each spindle—one spindle is for heavy milling, boring, and other machining (18 tools), and the second spindle is for average machining (36 tools). It's called the Natco-G.S.P. machine, made under crosslicense with its French developer.

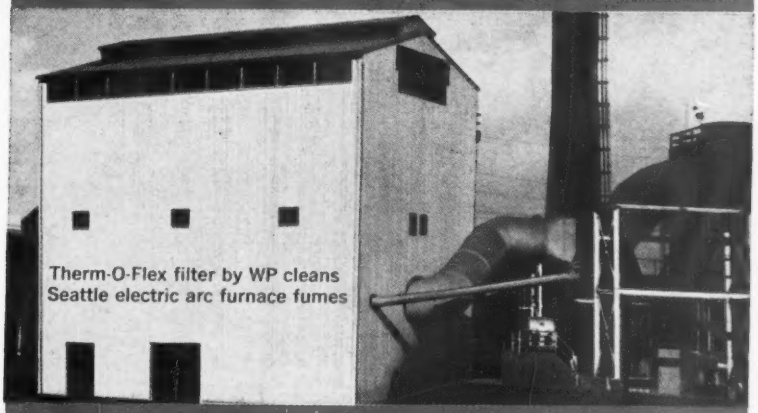


Dan Stenoien, president, and Elmer Hankes, owner, Numeric Machining Inc., Minneapolis, check out the mounting of a business machine frame part in the fixture. The tape controlled Milwaukee-Matic comprises the new job shop's production line



Electrostatic Precipitators by WP clean
Pittsburgh open hearth furnace gases

Open hearth steel in Pennsylvania... and electric arc in Washington...agree:



Therm-O-Flex filter by WP cleans
Seattle electric arc furnace fumes

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also: HOLO-FLITE Processors
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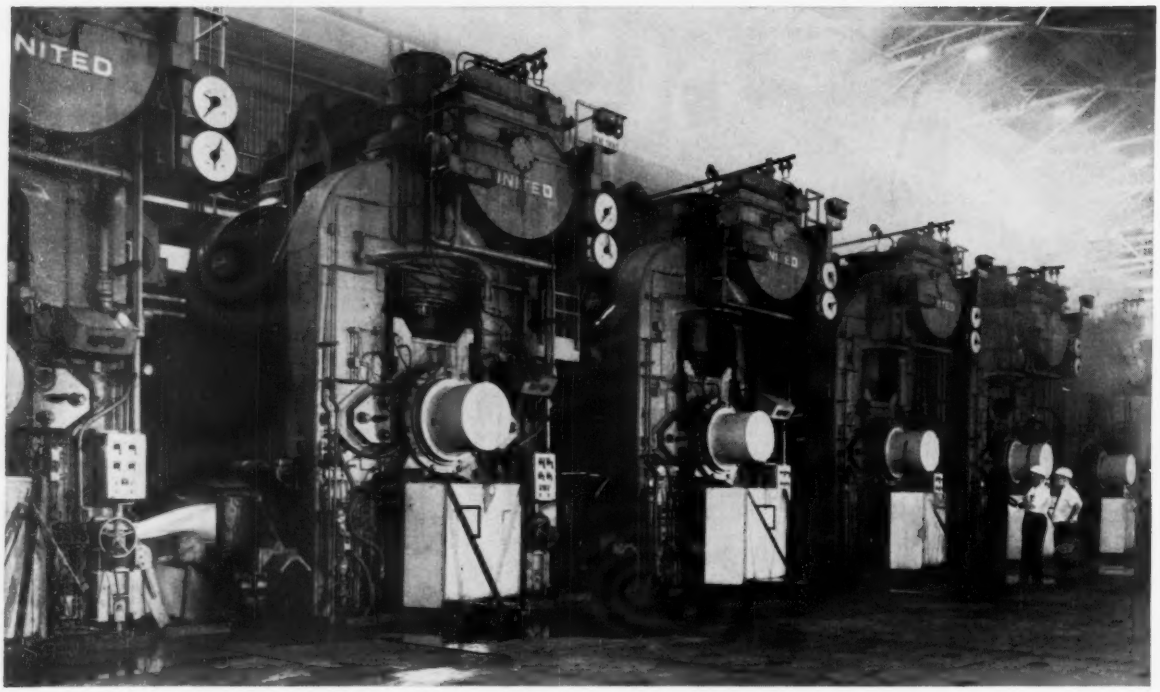
TURBULEX Calciners



Electronic and hydraulic devices automatically control strip gage in the finishing stands

Republic's New Strip Mill To Roll Variety of Steels

Operator controls reversing rougher for special orders, or in emergencies

• A HOT MILL designed to roll sheets from all standard grades of carbon steel—and powerful enough to process hard-to-roll grades of stainless, silicon, and high alloy steels—has been put into operation at the Warren (Ohio) works of Republic Steel Corp. (See STEEL, Sept. 25, p. 99.)

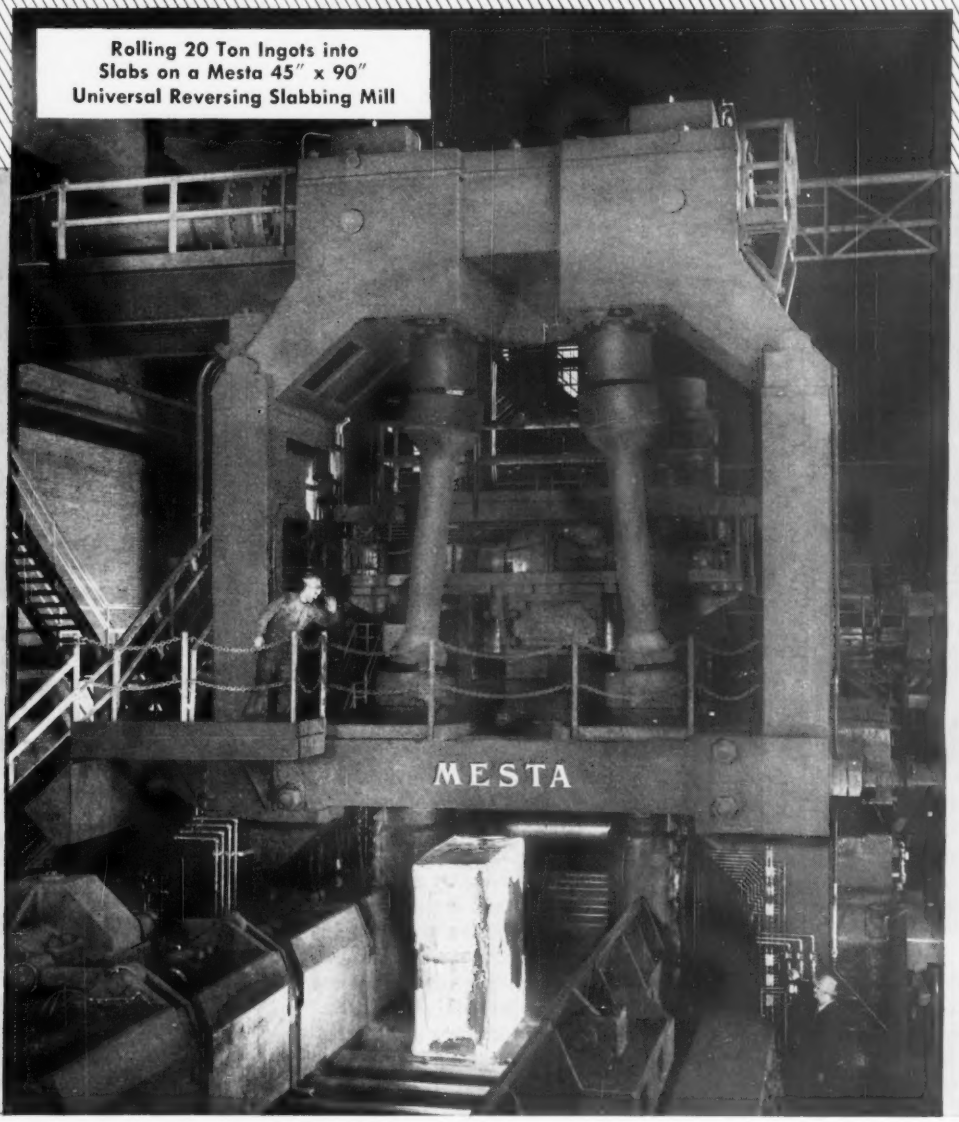
The 56 in., hot strip mill replaces an older, 42 in. facility, which has been dismantled. Increasing demand for sheets of specialty steels and alloys should help keep the highly automated mill operating near its rated rolling capacity.

• Automated areas in the mill are arranged for possible future tie-in with a central, process control computer.

Steel from the slab furnaces is processed under card programed control in the roughing area. The program card indicates slab feed and direction; roll opening on the two high, nonreversing roughing stand; mill table roll speed and direction; and the roll opening and direction of the 45 in., vertical edger. It also specifies roll speed, number

SLABBING MILLS

Designed and Built by MESTA



Rolling 20 Ton Ingots into
Slabs on a Mesta 45" x 90"
Universal Reversing Slabbing Mill

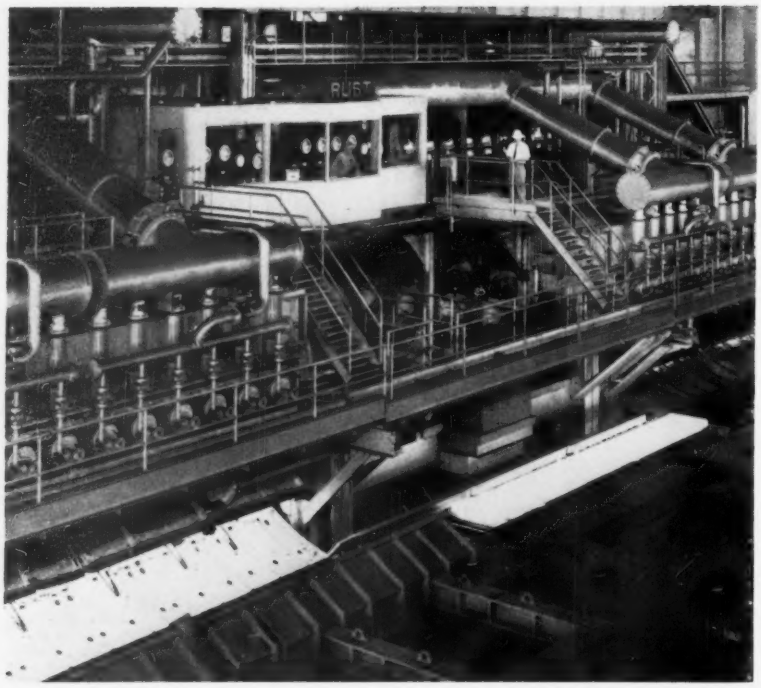
Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

PLANTS AT WEST HOMESTEAD AND NEW CASTLE, PA.

MESTA
THERE IS NONE BETTER



Steel slabs that weigh up to 50,000 lb are heated to about 2200° F in gas fired furnaces. Skids that carry slabs are staggered to insure uniform heating

of passes, and roll opening on the four high, reversing rougher, with its 36 in., vertical edger, and the speed and direction of the exit table rolls.

The six stand, four high finishing train automatically rolls strip to specified thickness; it employs load cells to measure rolling force on each stand, hydraulic screwdown controls, and fast response, hydraulic looper control.

Signals from the load cells actuate screwdown controls on stands No. 2 and 5 to provide automatic gage correction control in as little as 0.03 second. Loopers on all six stands insure constant tension control and serve as position indicators to regulate mill motor speed.

Thickness of the strip leaving the last stand—at speeds up to 2400 ft a minute—is monitored by an x-ray gage and recorded. An infrared device records width.

Automatic equipment weighs and bands the coils, which weigh up to 50,000 lb.

• Rolling capacity of the mill could be boosted by the installation of a third slab heating furnace.

Slabs for the mill are heated in two, triple fired, recuperative furnaces, each capable of processing 170 tons of steel an hour, or 70,000 tons a month. Current rolling capacity of the mill—140,000 tons a month—is governed by output from the slab furnaces. But installation of a third furnace of the same capacity would increase rolling capacity to 210,000 tons a month. (Space is reserved in the mill layout for a third furnace.)

An electrically heated, controlled atmosphere furnace is being built to heat specialty steels and alloys. A seventh stand may later be added to the finishing train, to process the harder to roll materials.

Two coilers are used to handle strip from the mill. Provision has been made for a third coiler.

• Operating efficiency is heavily emphasized in over-all mill design.

Every effort has been made to eliminate unnecessary work. Example: Scale from steel in process is collected under roller tables and mill stands, de-watered in vibrating feeders, and automatically discharged. The dry scale is re-used in the company's blast furnaces.

Lubricant for mill components is pumped from two, 20,000 lb storage tanks into headers that supply reservoirs for individual, automatic grease systems.

Superconductor Puts Muscle in Electromagnet

USING a columbium-zirconium base alloy that becomes a superconductor near absolute zero, Westinghouse Electric Corp., Pittsburgh, has produced a doughnut sized, 1 lb electromagnet comparable (in power) to a conventional 20 ton, car size unit.

Flux density (magnetic strength) is rated at 43,000 gauss. The magnet uses a half mile of wire (about the size of sewing thread) wound into 5000 turns in a coil or solenoid 2 in. in diameter and 1½ in. long with a ½ in. doughnut hole.

Though the coil must be immersed in liquid helium, the energy for cooling it is only a small fraction of that required to create a comparable magnetic field with conventional equipment. Total electric power requirements for the supermagnet are supplied by an automobile storage battery. The only power the battery continuously supplies is a few watts to overcome the resistance in the wires leading to the magnet.

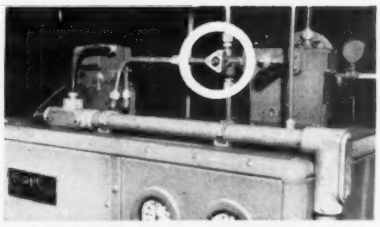
The development can be expected to benefit electric power generation, design of atom smashers, space travel techniques, and methods of containing and harnessing hydrogen bomb reactions, says Dr. J. K. Hulm, associate director of Westinghouse research laboratories.

Semiconductor Amplifies Ultrasonic Waves

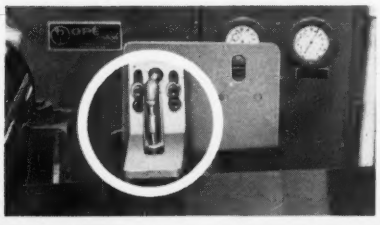
A NEW CLASS of solid state electronic devices (amplifiers, oscillators, for example) is made possible by piezoelectric semiconductor crystals which directly amplify ultrasonic waves, states Bell Telephone Laboratories, Murray Hill, N. J.

Applying a direct current field in the direction of wave propagation increases a 15 megacycle wave some 18 decibels, or a 45 megacycle wave 38 decibels in a crystal of cadmium sulfide 0.276 in. long.

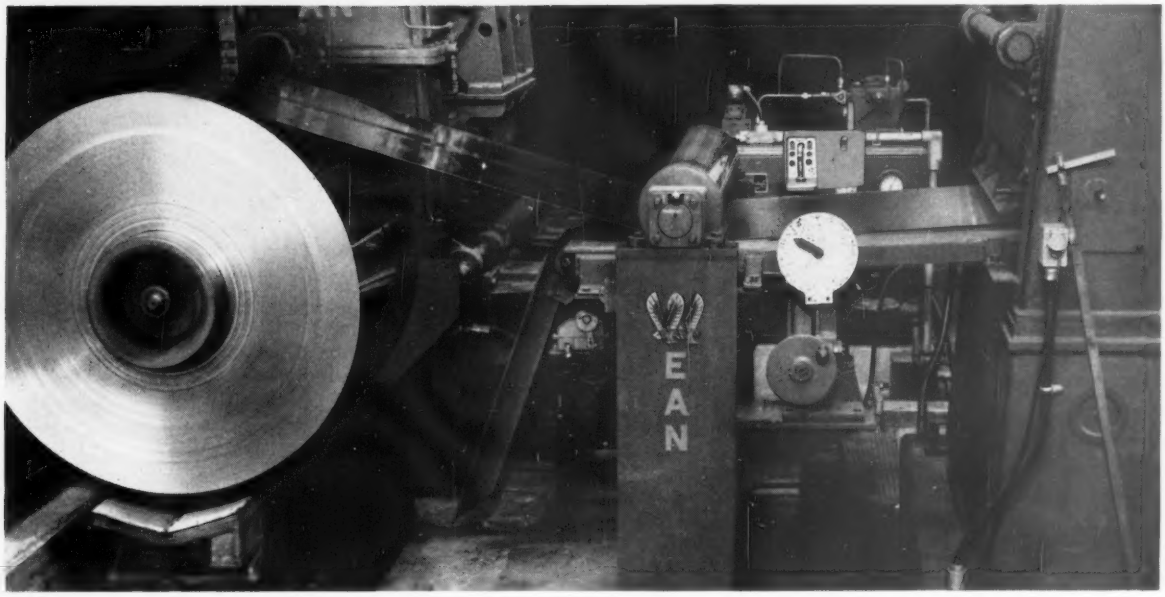
The amount of amplification depends on the applied voltage and the conductivity of the material. The crystals are also photoconductive so amplification can be varied by shining light on the crystal.



GPE CONTROLS ADJUSTABLE-GAIN BOOSTER — Even a slight error in strip position produces maximum corrective force with complete stability. A simple screwdriver adjustment matches the control system to your strip processing line. If it doesn't have this advanced feature, it's just not a modern strip guide!



NON-CONTACT, NON-CLOGGING SENSING HEAD — Nothing touches the gleaming surface of the strip but a breath of air! And only GPE Controls gives you precise, simple pneumatic sensing with patented non-clogging design. Maintains accuracy of control without excessive maintenance.



High-finish tinplate line at Granite City Steel uses GPE Controls Edge Guide for mirror-edge wind-up coil

This GPE Controls air-hydraulic strip guide – on the "B" Electrolytic Tin Line at Granite City Steel – is one of the four similar units now operating in this modern mill. And *three more* GPE Controls Strip Guiding Systems will soon be in operation.

Here at the wind-up, the line operates at about 1000 feet per minute. GPE Controls Strip Guide continuously positions the wind-up reel to produce a mirror-like metal edge on the wind-up coil. Tinplate quality is protected in handling and shipping because the coil edge is perfectly smooth!

Steelmakers and steel users alike have shown their preference for GPE Controls by making it the most widely used strip guide. For simplicity, for control accuracy, for construction that cuts maintenance to the bone—you can't beat GPE Controls!

Write for informative Bulletin EG84

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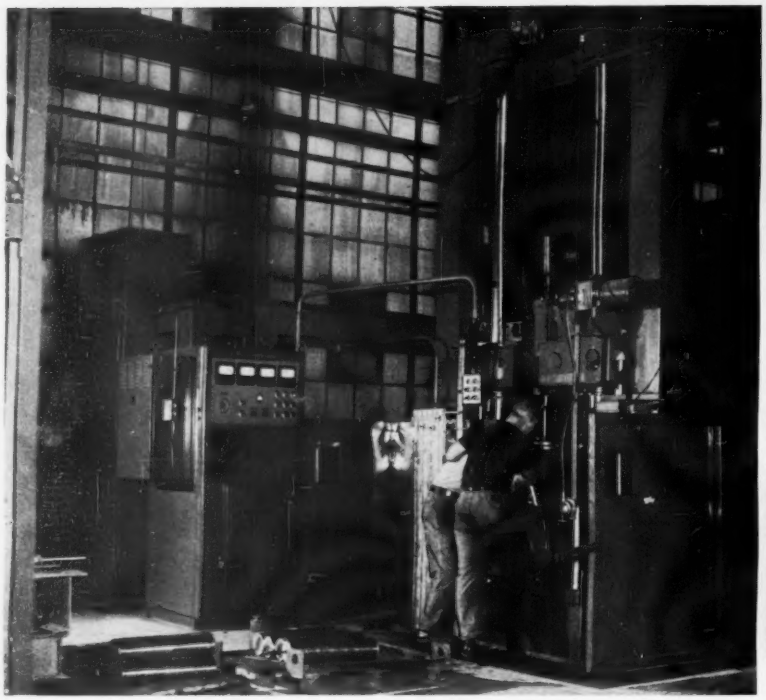
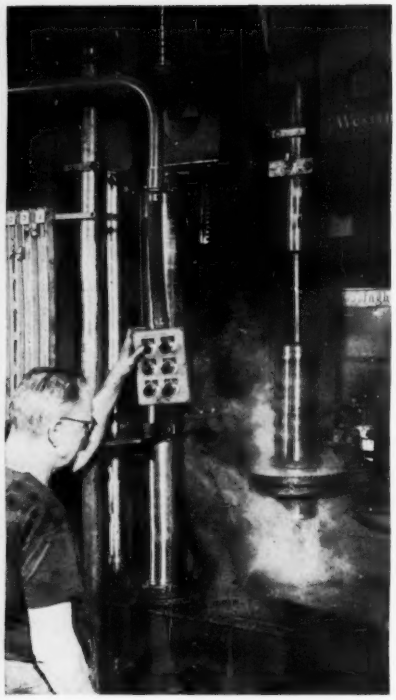




Crawler tread roller pin is loaded into the scanner . . . pin is heated, and quenched with oil-water mixture

Induction Device Hardens Parts For Huge Construction Machines

• THE NEED for larger heat treating equipment to accommodate larger construction machinery parts has been met by a huge induction scanning device at the Lima (Ohio) plant of the Equipment Div., Baldwin - Lima - Hamilton Corp. The equipment was supplied by the Industrial Electronics Dept., Baltimore, of Westinghouse Electric Corp.

The big unit makes it possible to harden and temper—in record time—the variety of parts now needed on larger crane shovels and other construction machinery.

• Rapid processing of parts and the upgrading of less expensive steels help reduce material and manpower costs.

"The machine can heat, quench, and temper a shovel shaft in a single process, instead of several, time consuming steps required by the previous method," says M. G. Johoske, supervisor of the heat treating department. "We figured that the scanner takes 5 minutes of heating, plus a self-tempering, cooling period, to do a hardening job that previously required 48 hours.

"The heating cycle for one part—a shovel tread roller pin—is 6½ minutes," says Mr. Johoske. "Residual heat in the pin is sufficient for self-tempering. The pin cools in about 3 hours; the usual batch of 24 pins can be finished in about 2 hours.

"But time isn't the only saving. We are able to use Type 1045 carbon steel, instead of more expensive, alloy shaft steel, like Type 4150—and still retain the required product quality. And the induction process virtually eliminates part breakage, thus reducing production delays. Spare part inventories can be smaller, of course, because of the high speed of the scanning process."

• Virtual elimination of rejects also helps hold down production costs.

"Rejects on the shovel shafts have been all but eliminated since we started using the scanner," says Mr. Johoske. "Savings in time, material, and other costs have been about 60 per cent. And those savings can be expected on other parts."

More praise for the scanner comes from Giles H. Howell, chief metallurgist at the Lima plant: "We tried using carburized, Type 4620 steel shafts before we got the scanner. The shafts required straightening after hardening; losses from excessive distortion came to about 40 per cent. And it took two days to treat the parts, besides

the time spent in hauling them to and from the various work stations."

• Versatile equipment, acquired primarily for treating long shafts, has great potential for smaller parts.

"We use the scanner mostly on long shovel shafts," reports Mr. Howell. "But its flexibility allows scanning of shafts 3 to 60 in. long, in diameters of 1.3 to 20 in. Items as short as ½ in. can be heated while they are rotating, although they aren't adaptable to scanning.

"Plans for the scanner are almost unlimited. When we bought the unit, it was designed to process about six different parts for our shovels, packers, and crushers. Now, it hardens about 25 items. Eventually, it will be used also to harden gears at substantial savings.

"Customer acceptance of induction heated parts makes the process an effective sales tool," Mr. Howell goes on to say. "We have even been asked by some of our competitors for information on induction hardening."

• Uncomplicated treating cycles eliminate the need for special tempering equipment.

The scanning unit includes a 15 ft, vertical scanner capable of a 60 in. continuous travel. It handles parts 7 ft long, weighing up to 1000 lb.

The largest part hardened by the scanner was a 91½ in. shovel shaft, 5 in. in diameter. Only 6 in. sections at the shaft ends were hardened. The job took 1 hour vs. about a week for hardening, tempering, and straightening outside the plant.

In a typical treating operation on a shovel tread roller pin, which is 22 in. long, 5¼ in. in diameter, and weighs 135 lb, the pin is raised in the coil and scanned downward, with partial power, for preheating. Then the pin is raised in the coil and scanned downward, with enough power for a 1700° F surface temperature. Below the coil, a spray ring applies soluble oil for quenching. Preheating, final heating, and quenching produce a residual heat of 450° F for tempering. That eliminates the need for special tempering equipment.

Organic coating on steel water line shows how . . .

Composite Materials Offer Rust Resistance, Strength

• FACED with a problem that cannot be solved with any one material? Why not try a combination? Example: The corrosion resistance of an organic product is combined with the strength of steel in a new, industrial plant water line that serves open hearth furnaces at South Works (Chicago) of United States Steel Corp.

Pipe sections were coated at the Hammond (Ind.) plant of Hill Hubbell Co., with a coal tar based, epoxy resin material formulated by Dearborn Chemical Co., Chicago. The coating, a two part, amine-cured material with a pot life of half an hour, is based on an epoxy resin made by Shell Chemical Co.

• Uniform composition is said to make the organic material desirable as a coating for the steel pipe. High solid content causes it to set rapidly.

Coating components (resin and activator) were kept separate until they were metered, mixed, and sprayed on the pipe. Shortly before the material was applied, the pipe surface was grit blasted to bare metal.

The coating was applied outdoors; pipe sections ⅜ in. thick and 20 to 48 in. in diameter were supported at both ends on a rotating trolley pipe carrier, which was revolved constantly during application. Rotation was stopped as soon as the coating was applied because sagging or rivering of the material is said to be minimized by its thixotropic properties (its tendency to gel, except when it is agitated).

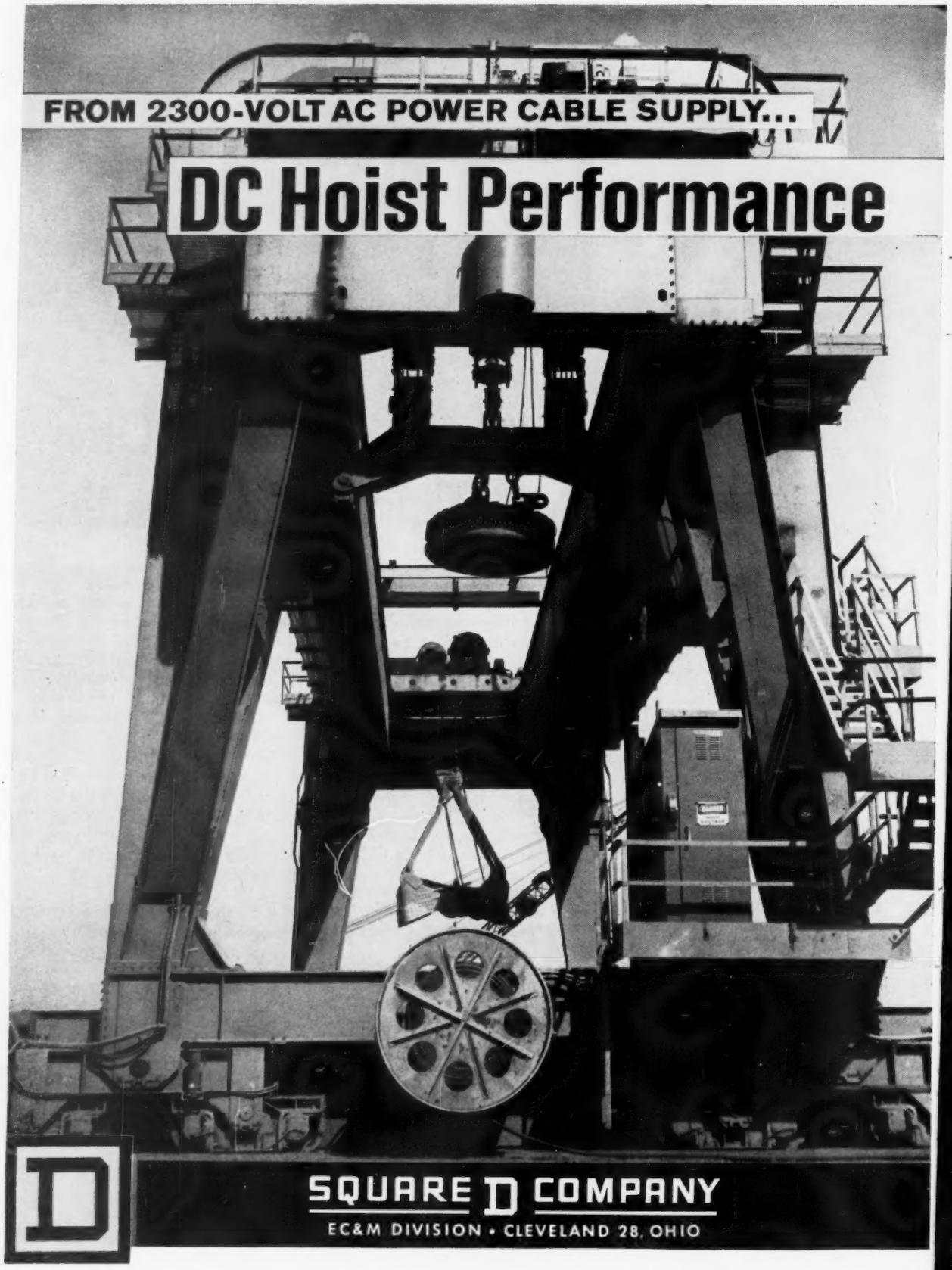
The material was applied to a wet thickness of about 0.025 in., then cured at prevailing outdoor temperatures. A spreader sling was used to carry pipe from the coating rig to the storage area, where it was supported on cutback ends until the coating was cured. Dry coating thickness: About 0.020 in.

• Special handling after coating and curing isn't necessary.

Belts were used to handle the pipe during installation. Coating repair was said to be minimized because little or no damage was incurred in handling, storage, transportation, and installation.

Buttwelded pipe joints were x-rayed to insure sound welds. The coating is said to resist charring at welding temperatures well enough to limit cutback areas at pipe ends to 2 in.

After welding and x-ray inspection, welds and cutbacks were power brushed and coated with the epoxy material, which was cured rapidly by residual welding heat.


FROM 2300-VOLT AC POWER CABLE SUPPLY...
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with greater economy, simplicity and safety!

You get these exclusive advantages with EC&M's Type HWR Control–

- *DC hp less than the AC counterpart*
- *40% fewer collector bars*
- *No load brakes*
- *No rotary converters*
- *Simpler installation*
- *Easier maintenance*
- *Uses series motors and series-wound hoist brakes*
- *Unequalled safety of the EC&M Wright Hoist Circuit*

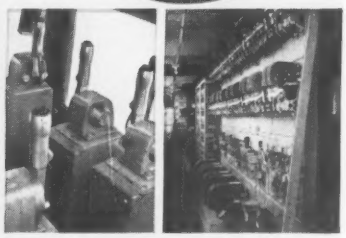
This double trolley (100/30-ton hook and 20-ton bucket) gantry crane was built by Cleveland Crane and Engineering Company. It is used for efficient slag handling by Heckett Engineering Company at the East Chicago, Indiana, plant of Inland Steel.

EC&M Type HWR controllers for the hoist motions were selected for their ability to handle the wide load range of slag-pot, bucket and magnet. Trolley motors are operated by EC&M frequency relay controllers. An EC&M quadruplex frequency relay controller operates the four gantry travel motors in unison.

Before buying AC cranes, ask the crane builder about the proved advantages of EC&M Type HWR Control.

Collectors are sectionalized in two end parking zones and one middle working zone. Only 16 collectors required for the lifting magnet circuit and for the 6 motors on both trolleys (2 hoist motors and 1 travel motor per trolley).

Incoming line cubicle includes 2300-volt disconnect switch and 2300/220-volt transformer as well as 220-volt manual-magnetic disconnect switch.



EC&M Type VM master switches require minimum mounting space in cab. Controllers are mounted in walk-in control house on bridge footwalk.

***Write** for Brochure 6414 — it describes and illustrates HWR control in detail*
Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio

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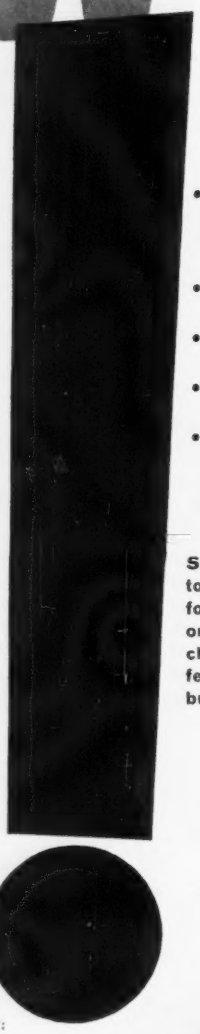
Portland, Oregon Bulk Unloader Ready to Slash Import Costs

Portland Public Docks proudly announces completion of its giant new straight-line bulk unloader and pier—the only plant of its kind on the Pacific Coast! With a rated-capacity of 900 tons-an-hour, this facility cuts the heart out of dry bulk importing costs and puts the savings in your pocket.



- direct transfer from ship to rail or truck
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Specially designed to create savings for importers of ores, ore concentrates, chemicals, salts, feeds and all dry bulk cargoes.

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Four Ways to Make Cobalt Base Alloys Better Cited

COBALT alloys can probably be improved in reliability, forming ease, machining, joining, and high temperature properties by heeding a four point program, says Dr. F. R. Morral, director of Cobalt Information Center activities at Battelle Memorial Institute, Columbus, Ohio:

1. Checking the possibilities of less complex alloys (fewer alloying elements).
2. Investigating the precipitation from cobalt solid solutions and dispersion hardening of cobalt solid solutions by means of oxides and intermetallics.
3. Determining the effects of alloying and tramp elements on commercial cobalt alloys.
4. Performing creep and stress rupture testing of commercial and development base alloys at higher temperatures (1900 to 2150° F) than is commonly done.

Device Is Designed for Blast Furnace Coal Use

EXCLUSIVE rights to a device and related techniques for the controlled introduction of solids into a stream of air—against substantial pressures—in metallurgical furnaces have been granted to Koppers Co. Inc., Pittsburgh, by Bituminous Coal Research Inc., Pittsburgh.

Koppers plans to first use the method, which includes a device called a "coal pump," for injecting coal into blast furnaces. The coal pump was developed by the Locomotive Development Program of Bituminous Coal Research during work on coal fired, gas turbines.

Bituminous Coal Research will make available to Koppers the results of about 12 years of intensive research on the application. The two organizations are doing additional development programs on applications, so Koppers can offer a highly perfected installation for immediate, full scale use.

Injection of coal into blast furnaces (to replace a substantial part of the coke) will be of economic benefit in the ironmaking process in many areas.

Bar Chart Recorder Monitors Variety of Equipment

WITH THIS bar chart recorder, the efficiency of up to 40 production or data processing machines can be monitored and recorded. Besides providing cost and production control information, the recorder can also list operator, job, and shift number (corresponding to any manual effort on the part of the operator).

Performance of each machine is sampled and graphically recorded every 20 seconds. Dr. John Gorrell, developer of the unit, says it can monitor almost any machine, process, operation, or series of events.

For further information, *write* Electronic Associates Inc., Long Branch, N. J.

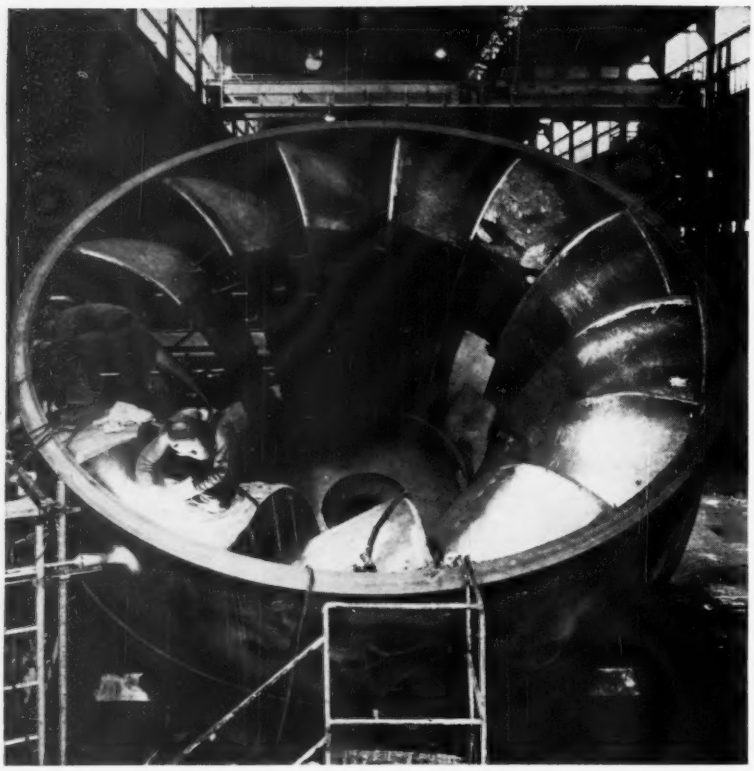
Equipment Handles Electrochemical Machining

USING an electrochemical process, two machines developed by Cincinnati Milling Machine Co. remove hard to machine metal at production rates.

The tool imparts its shape to the metal being machined. Rapid chemical reaction is caused by an electric current through the electrolyte. The company says surfaces are free from burrs and stresses.

The No. 0 machine has 8 in. of quill traverse (No. 1 has 22 in.). A solid table or moving table saddle unit can be supplied for either machine. A special, three spindle machine is being constructed and other special machines can be designed to specifications. Model No. 1 contains an antifriction bearing for the quill, a Plexiglas enclosed work area, and reservoir tank and pump unit for the electrolyte. The vertical head unit has an antifriction quill movement to help assure positive, uniform feed of the electrode into the work. Power supplies from 1000 to 10,000 amperes operate between 1.5 and 24 volts dc. Auto-

WELD WITH ARCOS STAINLESS ELECTRODES



Job Report Courtesy of Allis-Chalmers Mfg. Co., Milwaukee, Wisconsin

Hydraulic turbine runner blades overlaid to resist cavitation. To protect the blades of this huge hydraulic turbine runner from the destructive effects of water wear, Arcos stainless rods were selected for overlaying critical areas. The precise chemical and metallurgical properties of Arcos stainless rods—assuring uniform, predictable results—make this process both dependable and economical. Meet your stainless welding requirements with Arcos—the most complete selection available anywhere.

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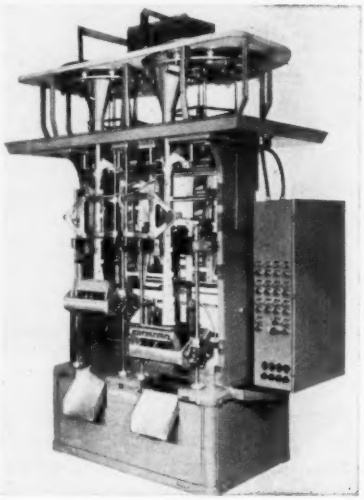
matic voltage or current stabilization is provided.

For further information, *write* Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Packaging Machine Uses Papers, Films, Foils

A WIDE variety of products can be packaged in all types of heat sealable papers, films, and foils at speeds up to 200 bags a minute. The Expand-O-Matic packaging machine does the job.

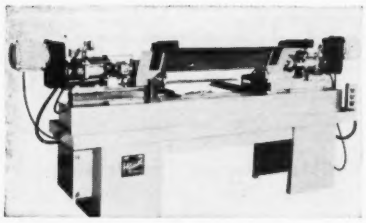


For single tube operation of 100 bags a minute, one draw bar and tube forming mechanism is provided. Basic main frame and drive mechanism remain the same for double tube operation. The production of a single tube machine can be economically doubled at any time. A fully equipped machine can simultaneously package two different products in two dissimilar packaging materials.

For further information, *write* Hayssen Mfg. Co., Sheboygan, Wis.

Unit Rolls Threads on Rods 76 in. Long

THREADS can be automatically rolled on both ends of steel aluminum and brass rods at a rate up to 3000 parts an hour (6000 threads)



with the Size A Holomatic double end machine. Threads in sizes 6-40 to 7/8-9 up to 4 in. long can be rolled on rods from 5 to 76 in. long.

The operator is required only to place rods in the magazine storage arms. The unit automatically escapes, locates, clamps, thread rolls, unclamps, and ejects the parts in proper sequence. Setup for different lengths can be made quickly, says the company. The machine can be single cycle or automatically operated. Spindle speeds from 300 to 3600 rpm are available. Tooling changes enable use of the machine for drilling, centering, chamfering and facing.

For further information, *write* Hause Machines Inc., Montpelier, Ohio.

High Speed Lift Trucks Designed for Heavy Duty

HIGH speed, heavy duty work cycles can be handled by the Model ERS fork lift trucks introduced by Automatic Transportation Co. Available in 3000 and 4000 lb versions, the compact, electric trucks are highly maneuverable.

The trucks, fully loaded, are capable of climbing ramps inclined more than 15 per cent. A control system called the Current Miser is

BETTER WELDING THROUGH ARCOS QUALITY CONTROL

X-ray Emission Spectrograph shows analysis of Arcos weld metal

Predictable performance of Arcos weld metal results from strict adherence to uncompromising standards. The program of rigid quality control of filler metal products enforced by Arcos is comprehensive and far-reaching. Every phase in production is subjected to constant inspection. Modern testing instruments provide highly accurate analysis of materials and weld metals. Rigid quality control assures predictable performance of Arcos filler metal products.

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said to save up to 60 per cent of battery power during maneuvering and results in more tons handled by each truck during a given work period.

For further information, *write* Automatic Transportation Co., a division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill.

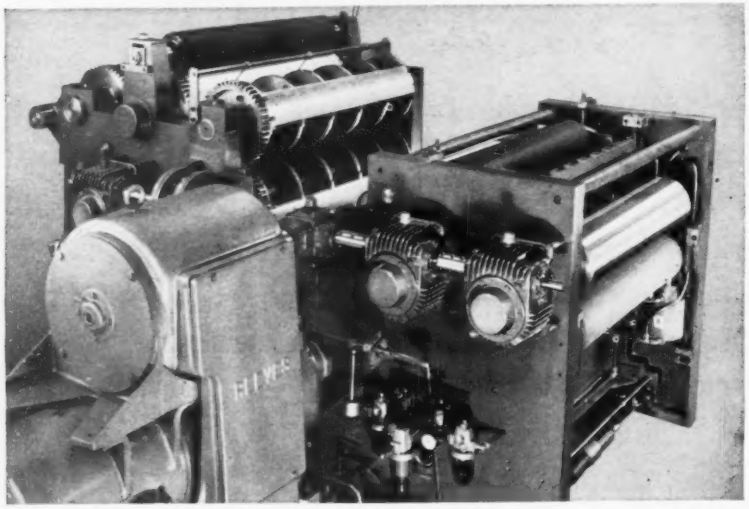
Abrasive Cutoff Saw Handles Exotic Metals

AN ABRASIVE cutoff saw made by Obear cuts 1 in. angle iron in 2 seconds, 2 in. angle iron in 4 seconds, 2 in. pipe in 3 seconds, and 2 in. solid stainless steel in 10 seconds.

The unit (Mercury Junior Model, dry electric saw) is mounted on an aluminum base and pedestal casting. The top table unit pivots to allow chop stroke cutting. The cutoff wheel is fully guarded.

The 16 in. diameter wheel capacity and special 2750 rpm arbor-shaft speed provides fast cutting action and can accommodate 4 in. tubing or 2 in. solids. The company says the unit performs well with exotic metals.

For further information, *write* Obear & Sons Inc., 940 W. Florence Ave., Inglewood 1, Calif.



Paster Pampers Printing Presses

Splicing a new roll onto an expiring ribbon of paper while it's moving 300-ft. per minute requires precise timing and accurate synchronization. This automatic butt splicer uses three Cone-Drive **double-enveloping worm** gear hollow shaft speed reducers to transmit the vitally important synchronized drive speed instantaneously and smoothly. The fact that these are standard, not special, reducers testifies to the high degree of accuracy built into every Cone-Drive unit.

Accurate Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

NEW Literature

Write directly to the company for a copy

Bibliography on Spectroscopy

A pocket sized bibliography on ultraviolet, visible, and near infrared spectroscopy contains more than 250 references. Technical Information Dept., Scientific & Process Instruments Div., Beckman Instruments Inc., 2500 Harbor Blvd., Fullerton, Calif.

Fiber Parts

A guide for the design and specification of laminated plastic and vulcanized fiber parts is presented in an eight page article. Based on a study of common errors in designing and specifying parts, the article discusses the general principles of sound specification and design and also describes no cost extras and cost reducing considerations that are often overlooked in ordering. Taylor Fibre Co., Norristown, Pa.

Snap Action Switches

Ideas submitted by plant engineers and electricians showing how they've used snap action switches to increase production efficiency are presented in a four page brochure. Micro Switch Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Lead Cable Sheathing

First of a series, a booklet entitled *Production, Properties, and Uses of Lead Cable Sheathing* provides a general introduction to lead sheaths. Advantages in manufacture, reliability, and cost are described. Lead Development Association, 34 Berkeley Square, London W. 1, England.

NEW BOOKS

Data Systems for Military Packaging (AMA Management Report 61), American Management Association, 1515 Broadway, New York 36, N. Y., 112 pages, $3 ($2 for AMA members)

Twenty-four industrialists and U. S. government defense officials explain the latest developments in the fields of packaging, preservation, protection, transportation, and handling of manufactured defense goods.

The Canadian Trade Index (1961), edited by W. D. H. Frechette, The Canadian Manufacturers' Association, 67 Yonge St., Toronto 1, Ont. 1146 pages; $12 to members, $15 to nonmembers

This guide to Canadian products and makers includes a comprehensive list of manufacturers having more than local distribution (irrespective of membership in the association). Products are classified under about 10,000 different headings. An export section gives basic information on trade methods and services.

CALENDAR
OF MEETINGS

Oct. 4-6, American Machine Tool Distributors' Assn.: Fall meeting, Penn-Sheraton Hotel, Pittsburgh. Association's address: 1500 Massachusetts Ave. N.W., Washington 5, D. C. General manager: James C. Kelley.

Oct. 4-8, Porcelain Enamel Institute: Annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 1145 19th St. N.W., Washington 6, D. C. Managing director: John C. Oliver.

Oct. 7-10, Conveyor Equipment Manufacturers Association: Annual meeting, Ponte Vedra Inn, Ponte Vedra, Fla. Association's address: 1 Thomas Circle, Washington 5, D. C. Executive vice president: R. C. Sollenberger.

Oct. 8-13, American Trucking Associations Inc.: Annual meeting, Statler and Mayflower Hotels, Washington. Association's address: 1424 16th St. N. W., Washington 6, D. C. General manager: R. G. Atherton.

Oct. 9-13, Society of Automotive Engineers: National aeronautic meeting and display, Ambassador Hotel, Los Angeles. Society's address: 485 Lexington Ave, New York 17, N. Y. Secretary: Joseph Gilbert.

Oct. 10-12, National Electronics Conference Inc.: Annual convention and exhibit, Sherman Hotel, Chicago. Conference's address: 228 N. LaSalle St., Room 2104, Chicago, Ill. Executive secretary: R. J. Napolitan.

Oct. 12-15, National Screw Machine Products Association: Fall meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

Oct. 15-20, American Institute of Electrical Engineers: Fall general meeting, Statler Hilton Hotel, Detroit. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Oct. 16-18, Magnesium Association: Annual convention, Belmont Plaza Hotel, New York. Association's address: 122 E. 42nd St., New York 17, N. Y. Executive secretary: Jerry Singleton.

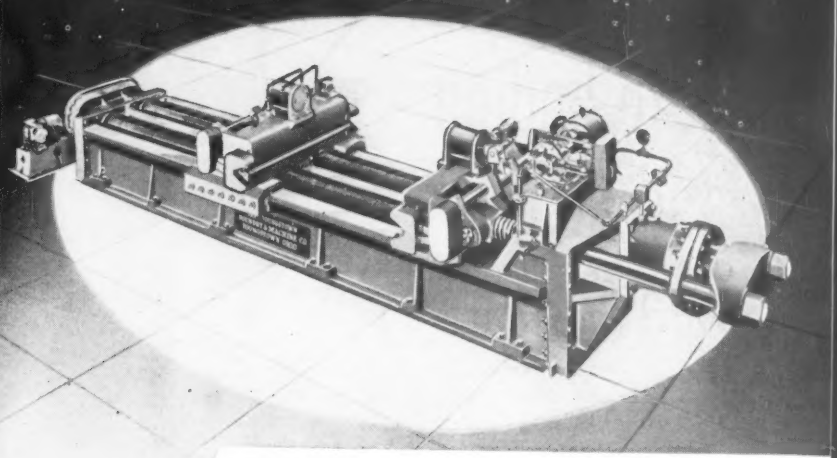
Oct. 16-19, American Vacuum Society: Second international congress on vacuum technology, Sheraton Park Hotel, Washington. Society's address: Box 1282, Boston 9, Mass. Secretary: Harold C. Weingartner.

Oct. 18-20, Gray Iron Founders' Society Inc.: Annual meeting, Royal York Hotel, Toronto, Ont. Society's address: 930 National City-E. 6th Bldg., Cleveland 14, Ohio. Executive vice president: Donald H. Workman.

"YOUNGSTOWN"

New Carriage-Type Design

STRETCHER LEVELER



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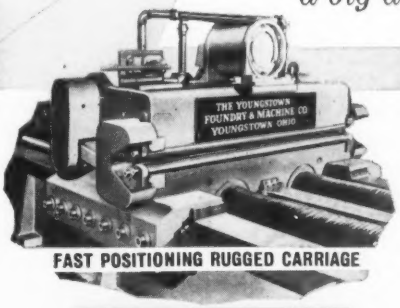

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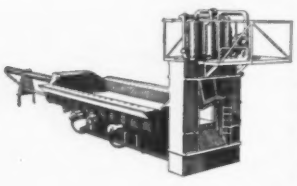

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Fourth Quarter Output: Up 15%

STEEL PRODUCTION will be about 15 per cent higher in the fourth quarter than it was in the third.

The only thing that might upset that prediction would be a long strike against one of the industry's big customers, Ford Motor Co. or Chrysler Corp. Market analysts won't be surprised if the automakers are hit by short strikes at some of their plants, but they don't expect serious trouble in bargaining at the national level.

If they're right, fourth quarter steel production should be nearly 30 million ingot tons—up substantially from the third quarter's 25.6 million tons and far in excess of the 18.9 million tons poured in the fourth quarter of 1960.

OUTPUT EDGING UP—With the strikes against General Motors Corp. settled, steelmakers are resuming shipments to their biggest automotive customer and gradually increasing their output of ingots. Look for this week's production to be slightly higher than the 2,120,000 ingot tons that STEEL estimates the industry poured in the week ended Sept. 30. Output then was 0.3 per cent above the previous week's. It was the highest of any week since that of May 7, 1960.

STRONGER OCTOBER SEEN—October's steel production will be about 5 per cent higher than September's, industry analysts predict. Reasons:

- **Increased Automotive Demand**—Barring unexpected shutdowns at Ford or Chrysler, automakers will produce about 500,000 cars this month. Last month, because of the GM strikes, they built only 345,000 of the 505,000 cars that were scheduled.

- **More Support from Other Industries**—Makers of appliances and furniture are stepping up their buying as they increase their output of next year's lines. Other users are coming into the market because their inventories aren't big enough to support planned production increases.

PROSPECTS FOR PRICES— Steel production costs went up yesterday when the second and final wage increase under the present steel labor contract became effective. It left producers with a knotty problem: Whether to raise prices to recover some of the increased costs. Without a doubt, they feel restrictive pressures from competition and from the government. It's reasonable to expect that any steel price increase will be moderated by those influences.

Look for adjustments to come one-by-one on products that will best support the increases; also look for them to be instituted by companies that are big enough producers of these products involved to make the increases stick.

Producers are favored by one condition that is helpful to have in making price increases—a strong or rising level of demand. Demand has pushed output to the highest level in more than a year, and the rest of 1961 is expected to bring further improvement.

PROSPECTS FOR 1962—Next year, steel production will be 110 million ingot tons or better, and consumption will be equivalent to 108 million ingot tons (vs. 98 million tons in 1961 and 104 million tons in 1960), one industry analyst predicts. This outlook for 1962 consumption is concurred in by William P. Carlin, director of economics, Republic Steel Corp. He believes there will be a net increase in consumer inventories equivalent to 5 million ingot tons between Jan. 1, 1962, and Jan. 1, 1963.

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Wire	100	86

*Current prices were published in the Sept. 25 issue and will appear in subsequent issues.

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STEEL
QUARTERLY SURVEY

COMPONENTS	CURRENT INVENTORIES					4th Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
CASTINGS . . . . . Die, gray iron, malleable, nonferrous, steel.	4%	18%	62%	13%	3%	12%	61%	27%
OTHER FORMED COMPONENTS . . . . Forgings, stampings, springs, wire shapes.	3%	21%	48%	20%	8%	15%	58%	27%
MACHINED COMPONENTS . . . . . Bearings, couplings, cylinders, gears, screw machine products.	3%	21%	51%	18%	7%	16%	59%	25%
ELECTRICAL EQUIPMENT, MOTORS . .	6%	32%	42%	13%	7%	19%	61%	20%
FASTENERS	2%	23%	47%	24%	4%	17%	56%	27%
MECHANICAL RUBBER GOODS, BELTING	5%	31%	47%	14%	3%	12%	64%	24%

FIGURES are percentages of respondents to STEEL's quarterly survey. UNDERSCORED figures show how most respondents reported.

Component Stocks Start Moving Up

More buyers indicate higher inventory levels three months hence than at any time since early 1959. Strike and price hedging play minor parts as increased business causes rise

COMPONENT buyers in the next three months are going to take the first major step to boost their inventories since the recovery began last April.

Responding to STEEL's quarterly survey, 25 per cent of the purchasing agents say their inventories will be higher by Jan. 1, 1962, than they are today. Three months ago, only 10 per cent had such plans for the following quarter. Only 60 per cent intend to maintain the current status compared with 74 in the previous count.

• **Comfortable Niche**—As the chart above shows, about half of the buyers in each major group indicate stocks at the 30 to 60 day level. This is the strongest showing for what many consider the "normal" range since the survey of July, 1960. But there is one important difference: At that time, stocks were moving from higher to lower levels.

Despite the apparent upward movement going on this quarter, it is not likely to cause a major shift out of the middle group by yearend, but rather a strengthening of the 30-60 day position. It probably would take another three months' accumulation to move any of the underscored figures in the chart to the 60-90 category.

• **Hedging a Little**—While most of the stock building is considered a normal consequence of better business, there are scattered indications of hedging for various reasons. One truck builder comments: "Anticipation of fourth quarter strikes may increase bring-in totals above normal usage as a temporary measure." A maker of electrical equipment says: "The inventory is slightly higher than normal in comparison with sales. This is intentional because of expected price increases in October."

But most buyers apparently agree with a buyer for an office equipment maker who says: "Higher inventories anticipated three months hence reflect recently extended lead-times on those commodities."

The three groups of buyers which show the lowest current inventory position also show the strongest uptrend for the fourth quarter. In the previous survey, only 2 per cent of the buyers of electrical equipment and motors forecast an increase; 8 per cent of fastener pur-

chasers aimed higher; and 7 per cent of the rubber goods buyers indicated an uptrend.

• **Complaints**—Complaints on deliveries are up for the second consecutive survey, reaching the highest level since April, 1960. One-third of the respondents are having trouble, but no single component stands out. Likewise, mentions of overstocks are up, reaching the highest point in several years. One in four says he has too much of at least one component on hand.

Says Technology Is Key To Export-Import Battle

Upcoming technology will enable the U. S. steel industry to eventually win the battle for markets with foreign steelmakers, maintains Charles M. Beeghly, president, Jones & Laughlin Steel Corp., Pittsburgh.

Speaking on a radio broadcast, he said: "I'm convinced that we will not only retain our markets, but the U. S. steel industry will continue to grow with them."

He pointed out that in the struggle for foreign markets, U. S. industry is losing on a cost rather than a quality basis. Foreign producers have gained inroads with low grade products, while U. S. exports have risen on a dollar basis.

He cited growth in the use of improved raw materials in blast furnaces and the adoption of oxygen steelmaking techniques as advances in technology that will help U. S. steelmakers.

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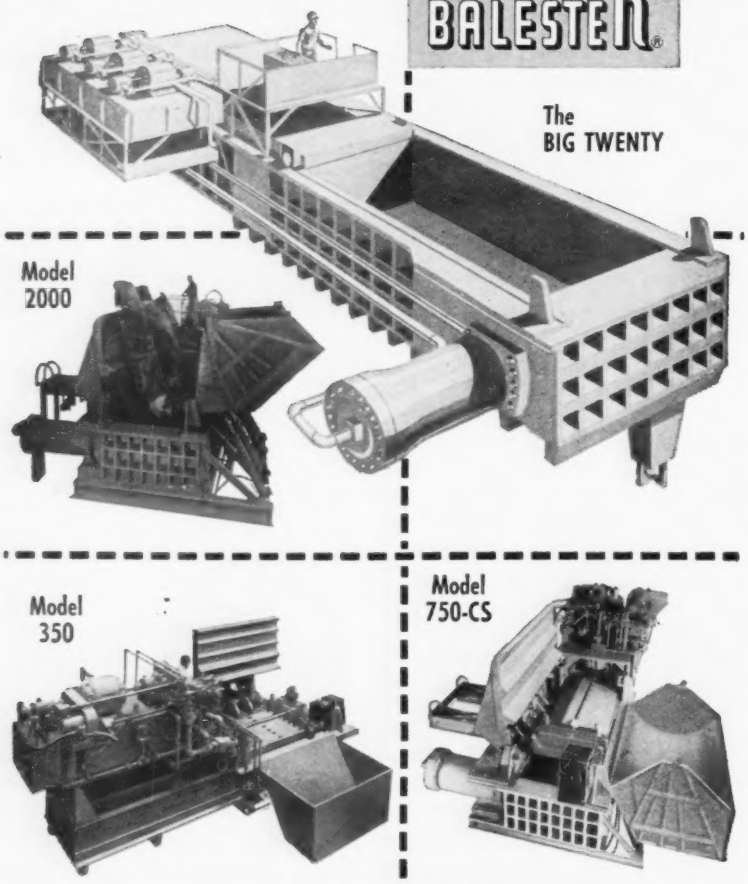

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Prices on Imported Steel Are Cut Sharply in Texas

With Texas steelmakers operating their plants at high levels, an overseas mill announced price reductions. The foreign producer has two representatives in Houston. They issued a new price sheet.

Some of the new prices: Angles (2 by 2¼ in.) $5.20 vs. $5.60 formerly; reinforcing bars $4.84 vs. $5.44; rounds and squares $5.43 vs. $5.87; flats (⅜ in. and over) $5.43 vs. $5.87; channels $5.78 vs. $5.92; I-beams $5.51 vs. $5.78. Angles are quoted $28.40 a ton below the domestic mill product.

A second foreign producer who also does a large volume business in Texas, has not joined in the price cutting. August steel imports into Texas totaled 45,000 tons.

Tubular Goods . . .

Tubular Goods Prices, Page 88

Demand for oil country goods is increasing, and it is being reflected in better pipe mill operations. However, rotary oil drilling rig operations were hard hit by Hurricane Carla. The Texas count dropped 36 to 628, the storm being blamed for most of the shutdowns. The U. S. total of active rigs for the latest week of record was 1828.

The Texas Railroad Commission has retained an eight-day producing schedule for October. The eight-day pattern set the oil allowable at 2,683,214 barrels daily, a decrease of 48,000. October is the sixth straight month on the eight-day pattern.

Softening of the market for cast iron pipe is evidenced by the furloughing of about 200 employees by the American Cast Iron Pipe Co., Birmingham.

Canadian Service Centers Expect Last Half Pickup

Canadian steel service centers report business is fair to excellent. Half of the warehouses polled in a survey say first half sales this year were lower than in the like period of 1960, but 70 per cent find definite signs of a business increase in the second half, ranging from 3 to 30 per cent over the last half of 1960.

Significantly, 3 out of 4 Canadian distributors are maintaining lower inventories than at the same time a year ago. Nearly all, however, report stocks, complete from the standpoint of variety, are being augmented by facilities for shearing, burning, cutting, and slitting.

Ernest Samuel, president of the Canadian Steel Warehouse Association, estimates that the Canadian steel service center industry markets 15 per cent of steel produced, and handles and processes between 750,000 and 1 million tons, with a dollar volume (including other metals) of about $180 million annually. The industry employs 3000.

Distributors . . .

Prices, Page 89

Steel service center business is slowly expanding. Some improvement is traced to extension of mill deliveries. September bookings showed a gain over August's, and an October increase is anticipated. Users are covering their needs on a short term basis. In the Southwest, distributors expect a pickup in sales to follow in the wake of insurance settlements arising from Hurricane Carla.

Steel Bars . . .

Bar Prices, Page 84

Demand for steel bars is the best it has been in several months, partly reflecting a pickup in automotive requirements. Alloy bars are especially active, and cold drawn bars are participating in the general improvement. Delivery promises, however, have not tightened in any noticeable degree. Hot carbon bars are still available for shipment in two to four weeks.

Bethlehem Steel Co., Bethlehem, Pa., has booked several hundred tons of hot rolled bars for delivery to Watertown (Mass.) Arsenal for remelting.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 85

Heavy reinforcing bar consumption is reported at the height of the building season. Mill operations are close to capacity, but shipments are readily available in most cases. Producers and fabricators report September volume was close to that in August, which for some sellers was record breaking, and they're anticipating a good order volume this month. Much public work, particularly highway projects, is before the market.

Tin Plate Can Shipments Rise Slightly During July

Shipments of tin plate cans in July totaled 471,533 tons vs. 455,349 in June, reported the U. S. Bu-

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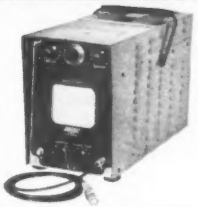

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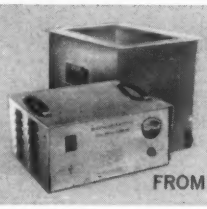

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reau of the Census. The cumulative total for the first seven months of the year was 2,686,254 tons against 2,575,738 in the like 1960 period.

Base boxes of tin plate consumed in July totaled 10,230,958, vs. 9,914,365 in June.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 90

Granite City Steel Co., Granite City, Ill., has started operation of a battery of 61 new coke ovens. The battery will carbonize about 1525 tons of coal daily, producing about 1000 tons of coke. The ovens were built by Koppers Co. Inc., Pittsburgh. They will increase Granite City's coal requirements to more than 1 million tons a year. About 75 per cent of the pulverized coal blend charged into the coke ovens is Southern Illinois bituminous.

Semifinished Steel . . .

Semifinished Prices, Page 84

Since shipments of finished steel have not come up to expectations in recent weeks, most of the mills have been adding to their inventories of semifinished. Ingot production schedules have been fairly well adhered to, thus the laying down of semifinished stocks is more than had been anticipated.

The General Motors strike had little effect on total shipments for September. Before the end of the month, all steel rolled on GM account had been released for delivery. The mills did not cut back on rolling tonnage on order. Rather, they produced and stored the material, pending shipment releases.

Steel Ingot Output Rises To Peak Since May, 1960

STEEL INGOT production is the highest it has been since the week ended May 7, 1960. Output for the week ended Sept. 30 is estimated by STEEL at 2,120,000 tons, up 0.3 per cent over the previous week's total. Production during the week ended Sept. 23 was at a new high for the year in these districts: Northeastern, Pittsburgh, Cleveland, Chicago, and Cincinnati.

• **Youngstown** — Operations rose slightly more than 1 point to 68 per cent of 1960 capacity during the week ended Sept. 30. U. S. Steel Corp. started up an eighth open hearth at its Ohio Steel Works.

• **Buffalo** — Production is holding steady at about 61 per cent of 1960 capacity. Bethlehem Steel Co. took off an open hearth for repairs at its Lackawanna, N. Y., mill but will relight it soon. Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., placed in production a second open hearth furnace at its plant in Tonawanda, N. Y.

• **Birmingham**—The ingot rate for the Birmingham-Gadsden-Atlanta area dropped about 2½ points to 69.5 per cent of capacity in the week ended Sept. 30.

• **Cincinnati**—Steel production is steady here at about 80 per cent of 1960 capacity.

• **Chicago**—Steelmaking dipped 2 points during the week ended Sept. 30 to about 73 per cent of 1960 capacity. Most mills scheduled lighter ingot production, due in part to a closer gearing of output to shipments and in part to the fact that some finishing facilities are down for repairs and maintenance.

• **Philadelphia**—Production in the Northeastern district showed a further increase in the week ended Sept. 30.

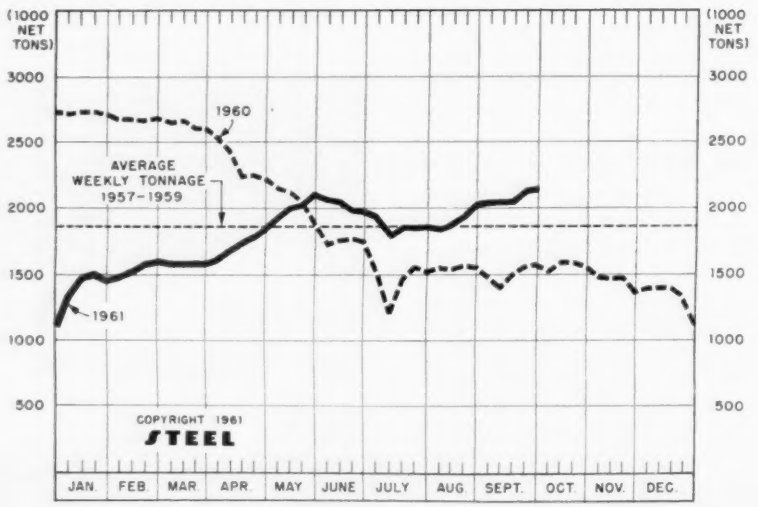
• **Pittsburgh** — Operations held at about 72 per cent of 1960 capacity during the week ended Sept. 30.

STEEL INGOT PRODUCTION

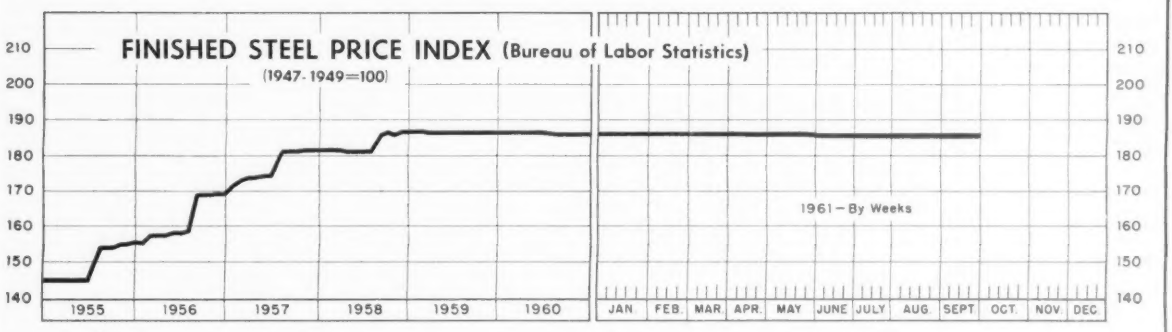
Weeks Ended	Net Tons	Change
Sept. 30	2,120,000*	+ 0.3%
Sept. 23	2,114,000	+ 4.0%
Sept. 16	2,032,000	0
Totals to Sept. 23		
1961	68,318,000	−12.7%
1960	78,243,000	

DISTRICTS	Week Ended —Sept. 23— Tons‡	Index†	Week Ended Sept. 16 Index†
Northeastern	315,291	118	114
Buffalo	96,381	99	103
Pittsburgh	427,762	106	101
Youngstown	169,981	100	97
Cleveland	131,485	142	134
Detroit	155,277	148	143
Chicago	433,928	116	111
Cincinnati	93,502	124	113
St. Louis	46,770	89	93
Southern	109,480	101	89
Western	133,281	114	112
Industry	2,114,000	113.5	109.1

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Sept. 26, 1961	Week Ago	Month Ago	Sept. Index	Year Ago
185.6	185.6	185.6	185.6	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	(N.A.)
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.423
		Casing, Oil Well, Carbon (100 ft)	193.028
		Casing, Oil Well, Alloy (100 ft)	202.645
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	192.285
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	8.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Sept. 27 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	225.71
Index in cents per lb	6.713	6.713	6.713	6.713	6.114

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$137.75
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	62.63
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	62.18
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	63.41
Steelmaking Scrap, GT	39.83	39.83	38.67	31.33	58.17

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 27 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	5.075
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	5.075
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.9.5	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.85
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	5.00
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	5.00
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.85
Plates, Chicago	5.30	5.30	5.30	5.30	4.85
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	5.25
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.85
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.75-5.85
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	6.30
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.95
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	7.20
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	8.35
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$91.50
Wire rods, 7/32-9/32" Pitts.	6.40	6.40	6.40	6.40	5.50

PIG IRON, Gross Ton	Sept. 27 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$63.50
Basic, Valley	66.00	66.00	66.00	66.00	62.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.07	66.26
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.57	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	59.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	66.70
Malleable, Valley	66.50	66.50	66.50	66.50	63.00
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$37.50	$37.50	$35.50	$30.50	$56.50
No. 1 Heavy Melt, E. Pa.	40.50	40.50	40.00	35.00	58.00
No. 1 Heavy Melt, Chicago	41.50	41.50	40.50	28.50	60.00
No. 1 Heavy Melt, Valley	42.50	42.50	39.50	31.50	65.50
No. 1 Heavy Melt, Cleve.	38.50	38.50	36.50	29.50	63.00
No. 1 Heavy Melt, Buffalo	32.50	32.50	31.50	29.50	57.50
Rails, Rerolling, Chicago	61.50	61.50	60.50	52.50	84.50
No. 1 Cast, Chicago	44.50	44.50	42.50	38.50	53.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.50
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	17.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	29.50

Steel Prices

Mill Code number following mill point indicates producing company. Key to producers, page 85; footnotes, page 87.

base prices reported to STEEL, Sept. 27, cents per pound except as otherwise noted. *Changes shown in italics.*

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOT, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..98.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Oweneboro,Ky. C8 .....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ..109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2,T7 ....119.00
Conshohocken,Pa. A3 ,121.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ...119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. P5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ...6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 .6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
N.Tonawanda S47 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 .6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 8.05
Jonhstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ...6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ...5.30
Aliquipa,Pa. J5 .....5.30
Ashland,Ky(15) A10 ...5.30
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1 .7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 .....6.05
Warren,O. R2 .....6.05

FLOOR PLATES

Cleveland J5 .....6.375
Claymont,Del. P4 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 .6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minneque,Colo. C10 ...6.125
Niles,Calif P1 .....6.375
N.Tonawanda S47 ....5.675
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5.5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
N.Tonawanda S47 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra)

Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.10
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ...7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ...8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.16
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.25
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 ....9.025

Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
N.Tonawanda S47 ....9.025
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ....6.425
Fontana,Calif. K1 .....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
Seattle A24, B3, N14...6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ...7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(B.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks.(D.R.) L5 ...20.50
McK.Rks.(DirRolled)L5 13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2...5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1.....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.125	7.375
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.225	....
MartinsFry. W10	7.125	7.375
Pitts.Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.375

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1.....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 .....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.H'b'r,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Div., Roblin-Seaway Industries

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Cold Drawn Steel Div., Standard Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ...5.10
Lackaw'na,N.Y.(25) B2..5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ...5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2,Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 .....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 ..7.575
Warren O. R2 .....7.575
Weirton,W.Va. W6 .....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10.7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.425
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10 7.875
NewBritain,Conn. S15 ..7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 ....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ....7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ...15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ....15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 .....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.06	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	....	....	18.85	22.95	27.80
Buffalo W12	....	....	18.85	....	....
Fostoria,O. S1	....	....	19.05	22.15	....
FranklinPark,Ill. T6	....	....	19.20	23.30	28.15
Harrison,N.J. C18	....	....	18.85	22.95	27.80
NewYork W3	....	....	18.85	22.95	27.80
Palmer,Mass. W12	....	....	18.85	....	....
Trenton,N.J. R5	....	....	18.85	22.95	27.80
Worcester,Mass. A7, T6	....	....	18.85	22.95	27.80
Youngstown S41	....	....	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ...7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7....7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Basis Weight 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Electrolytic 0.25 lb (100 lb basis wt) Coating

Aliquippa,Pa. J5 .....$9.10
Fairfield,Ala. T2 .....9.10
Fairless,Pa. U5 .....9.10
Fontana,Calif. K1 .....9.75
Gary,Ind. U5 .....9.10
GraniteCity,Ill. G4 ....9.20
Ind.Harb.,Ind. I-2, Y1 ..9.10
Irvin,Pa. U5 .....9.10
Niles,O. R2 .....9.10
Pittsburg,Calif. C11 ...9.75
SparrowsPt.,Md. B2 ....9.10
Weirton,W.Va. W6 ....9.10
Yorkville,O. W10 .....9.10

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.20
Fairless,Pa. U5 .....8.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1 8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

ELECTRO. TIN-COATED SHEET (20-27 gage; per 100 lb)

IndianaHarb.,Ind. Y1 ..$7.90

(21-27 gage; per 100 lb)

Aliquippa,Pa. J5 .....$7.90
Niles,O. R2 .....7.90

TIN PLATE, HOT DIPPED COMMON COKE 1.25 lb 1.50 lb

Aliquippa,Pa. J5 $10.40 $10.65
Fairfield,Ala. T2 10.40 10.65
Fairless,Pa. U5 10.40 10.65
Fontana,Calif. K1 11.05 11.30
Gary,Ind. U5 ... 10.40 10.65
Irvin,Pa. U5 ... 10.40 10.65
Pitts.,Calif. C11. 11.05 11.30
Sp.Pt.,Md. B2 ... 10.40 10.65
Weirton,W.Va.W6 10.40 10.65
Yorkville,O. W10 10.40 10.65

HOLLOWARE ENAMELING (Black plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O (24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ....8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
N.Tonawanda S47 .....8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
S Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00
N.Tonawanda S47 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 .12.65
KansasCity,Mo. U3 ....12.90
LosAngeles(2) B3 .....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 .....13.70
Pittsburg,Calif. C11 ....13.45
Portsmouth,O. P12 .....12.65
Roebling,N.J. R5 .....12.95
Sparrowspt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 .....10.05
Pittsburg,Calif. C11 ..10.075
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ..10.075
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.20
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.20
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ill. MS..16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 .....13.75
Portsmouth,O. P12 .....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	....17.15
Roebling,N.J. R5	.....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....12.35
Baltimore T6	.....12.65
Boston T6	.....12.65
Buffalo W12	.....12.35
Chicago W13	.....12.45
Cleveland A7	.....12.35
Crawfordsville,Ind. M8	.12.35
Dover,O. G6	.....12.35
Evanston,Ill. M22	....12.45
Farrell,Pa. S3	.....12.35
Fostoria,O. S1	.....12.35
FranklinPark,Ill. T6	..12.45
Kokomo,Ind. C16	....12.35
Massillon,O. R8	.....12.35
Milwaukee C23	.....12.55
Monessen,Pa. P7, P16	..12.35
NewCastle,Pa. M23	...12.35
Palmer,Mass. W12	....12.65
Pawtucket,R.I. N8	....12.65
Philadelphia P24	....12.65
Riverdale,Ill. A1	.....12.45
Rome,N.Y. R6	.....12.35
Sharon,Pa. S3	.....12.35
Trenton,N.J. R5	.....12.65
Warren,O. B9	.....12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	...175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	...175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	...$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	..$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
Sparrows Pt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	..$8.78
Atlanta A11	.....10.36
Bartonville,Ill. K4	....8.88
Buffalo W12	.....10.26
Chicago W13	.....9.24
Crawfordsville,Ind. M8	..8.88
Donora,Pa. A7	.....8.78
Duluth A7	.....8.78
Fairfield,Ala. T2	.....8.78
Houston S5	.....9.02
Jacksonville,Fla. M8	..8.88
Johnstown,Pa. B2	.....8.78
Joliet,Ill. A7	.....8.78
KansasCity,Mo. S5	....9.02
Kokomo,Ind. C16	.....8.88
LosAngeles B3	.....9.20
Minnequa,Colo. C10	...8.02
Pittsburg,Calif. C11	....9.20
S.Chicago,Ill. R2	.....8.78
S.SanFrancisco C10	....9.20
SparrowsPt.,Md. B2	....8.88
Sterling,Ill. (37) N15	....8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	..$9.06
Atlanta A11	.....10.70
Bartonville,Ill. K4	.....9.16
Buffalo W12	.....10.60
Chicago W13	.....9.54
Crawfordsville,Ind. M8	..9.16
Donora,Pa. A7	.....9.06
Duluth A7	.....9.06
Fairfield,Ala. T2	.....9.06
Houston S5	.....9.30
Jacksonville,Fla. M8	..9.16
Johnstown,Pa. B2	.....9.06
Joliet,Ill. A7	.....9.06
KansasCity,Mo. S5	....9.30
Kokomo,Ind. C16	....9.16
LosAngeles B3	.....9.50
Minnequa,Colo. C10	....9.30
Pittsburg,Calif. C11	....9.50
S.Chicago,Ill. R2	.....9.06
S.SanFrancisco C10	....9.50
SparrowsPt.,Md. B2	....9.16
Sterling,Ill. (37) N15	....9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	..$9.11
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....9.21
Buffalo W12	.....10.65
Chicago W13	.....9.59
Crawfordsville,Ind. M8	..9.21
Donora,Pa. A7	.....9.11
Duluth A7	.....9.11
Fairfield,Ala. T2	.....9.11
Houston S5	.....9.35
Jacksonville,Fla. M8	....9.21
Johnstown,Pa. B2	.....9.11
Joliet,Ill. A7	.....9.11
KansasCity,Mo. S5	....9.35
Kokomo,Ind. C16	.....9.21
LosAngeles B3	.....9.55
Minnequa,Colo. C10	....9.35
Pittsburg,Calif. C11	....9.55
S.Chicago,Ill. R2	.....9.11
S.SanFrancisco C10	....9.55
SparrowsPt.,Md. B2	....9.21
Sterling,Ill. (37) N15	....9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	...212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill. (7) N15	214

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	...198**
Monessen,Pa. P7	.....196§
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
SparrowsPoint,Md. B2	..198§
Sterling,Ill. (7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa. J5	..17.85	19.65
Bartonville Ill. K4	..17.95	19.80
Chicago W13	....17.85	....
Cleveland A7	....17.85	....
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	..18.35	19.90†
Houston S5	....18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	..17.85	19.65§
Kan.City,Mo. S5	..18.10	....
Kokomo C16	..17.95	19.50†
Minnequa C10	..18.10	19.65**
P'lm'r,Mass. W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	..17.95	19.75§
St'ling(37) N15	..17.95	19.80
Waukegan A7	..17.85	19.40†
Worcester A7	....18.15	....

FENCE POSTS — Col.

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	..177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	...177

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	.....187**
Aliq'ppa,Pa.9-11½Ga.J5	190§
Atlanta A11	.....191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A1	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality 6 to 8 gage — An'ld — Galv.

Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.10	9.85
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
CrawfordsvilleM8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'vill,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

FASTENERS

SCREWS, NUTS, BOLTS

(Consumer discounts per cent off list prices, plain finishes. For less than full container quantities, add 25 per cent; attaching nuts to bolts in sizes ¼ in. through ⅝ in. diameter through 8 in. in length, price on application. Discounts are determined by the quantity of screws, nuts, and bolts ordered for one destination at one time.)

Base, one keg	43.00
20,000 lb or more	53.00

SCREWS, SETSCREWS

Hex Screws and High Strength Hex Screws, through 1 in. x 12 in.:	
Base, one keg	43.00
20,000 lb or more	53.00
Hex Screws 1⅛ in. diameter and larger: See net price schedule.	
Fillister Head Screws, coarse thread:	
Packages	+70.00
Bulk	+28.00
Flat Head Screws, coarse thread:	
Packages	+100.00
Bulk	+52.00

Setscrews, Square Head, Cup-point, coarse thread:

Packages	+10.00
Bulk	15.00

(Bulk discounts on fillister, flat head, and set screws apply only to products ordered in these minimum quantities: ¼ in. through ⅝ in. diameter, 15,000 pieces; ¾ in. through ⅞ in. diameter, 5000 pieces; and 1 in. through 1 in. diameter, 2000 pieces.)

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85

7/16 in. and smaller by 6 in. and shorter; 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala, T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.725
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	.....6.875
Gary,Ind. U5	.....6.875
Lackawanna,N.Y. B2	..6.875
Minnequa,Colo. C10	...6.875
Seattle B3	.....7.025
Steelton,Pa. B2	.....6.875
Torrance,Calif. C11	...7.025

JOINT BARS

Bessemer,Pa. U5	.....7.25
Fairfield,Ala. T2	.....7.25
Joliet,Ill. U5	.....7.25
Lackawanna,N.Y. B2	...7.25
Minnequa,Colo. C10	....7.25
Steelton,Pa. B2	.....7.25

AXLES

Ind.Harbor,Ind. S13	...9.125
Johnstown,Pa. B2	.....9.125

SCREW SPIKES

Lebanon,Pa. B2	.....15.10

TRACK BOLTS, Untreated

Cleveland R2	.....15.35
KansasCity,Mo. S5	....15.35
Lebanon,Pa. B2	.....15.35
Minnequa,Colo. C10	...15.35
Pittsburgh S44	.....15.35
Seattle B3	.....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	....10.10
Lebanon,Pa. B2	.....10.10
Minnequa,Colo. C10	...10.10
Pittsburgh J5	.....10.10
Seattle B3	.....10.60
S.Chicago,Ill. R2	.....10.10
Struthers,O. Y1	.....10.10
Youngstown R2	.....10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) 5/16" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	..	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
No. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.16
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.13	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.18	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	10.50	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	8.00	9.28
Indianapolis	9.66	10.64	10.57	11.83	9.66	11.09	16.39	10.01	8.20	11.79
KansasCity	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.27	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	10.48	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	10.51	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	8.82	9.49	10.64	10.99	8.82	11.49	16.54	9.17	8.66	10.95
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in, except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; SaNna, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $176.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellsville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Nario, Ohio, $87.50. Dolomite-Magnesite: Nario, Ohio, $109.50. Magnetite: Nario, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Brands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.061 and heavier)	6.35
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill Products	(Per base box; 100 lb base wt)
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating).	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh bags	7.50††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10.	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5% below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe, except as noted.)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.55	$5.60	$5.50	$5.40	$5.70
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	5.75	5.90	5.80	5.70	6.00
Channels	5.75	5.90	5.80	5.70	6.00
Plates (basic bessemer)	5.65	5.70	5.60	5.50	5.80
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	23.66	23.72	23.59	23.31	25.04
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	6.05	6.10	6.00	5.90	6.20
Hot-Rolled Bands	6.05	6.10	6.00	5.90	6.20
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	....	5.95	5.95	6.20
Wire Rods, O.H. (Sumitomo, Japan)	5.95	....	5.90	5.90	6.05
Bright Common Wire Nails (‡)	7.30	7.35	7.25	7.15	7.45

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier. *Except Boston.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3% for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max), Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb. $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max, Si 1.0% max, S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%; C 0.025% max, 31.50c; C 0.010% max, 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%; C 0.25% max, 33.00c. Cr 65-71%; C 0.05% max, 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25 max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max. 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si. Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $2.45 per lb (all quantities) of contained W. Delivered.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l., packed 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.

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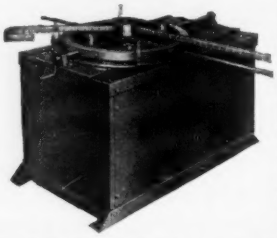
Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes, Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch, and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

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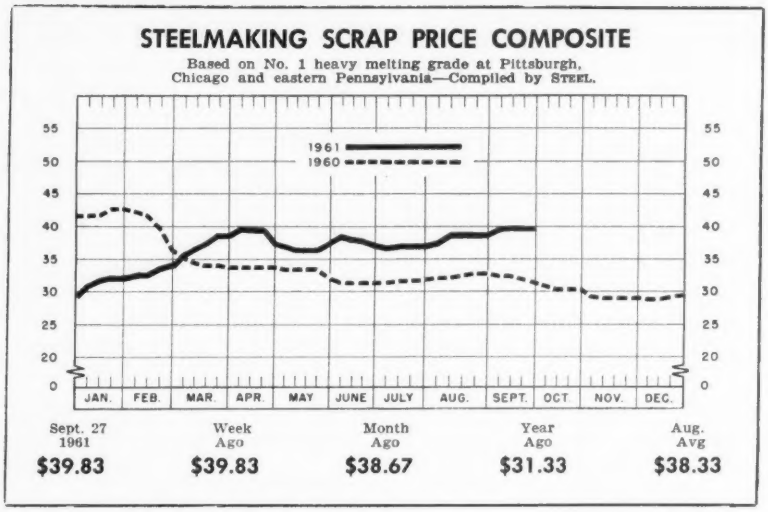


Scrap Market Drive Slows Down

Signs of easiness developing at some market centers, but STEEL's composite on No. 1 heavy melting holds unchanged at $39.83. Big Japanese purchase features trading

Scrap Prices, Page 94

• **Chicago**—An easier tone has developed in the market the last few days. Mill buying is light. The position of the market will become clear in the next few days when successful bids are announced on 11,000 gross tons of No. 1 factory bundles (for October delivery) to be offered by Ford Motor's stamping plant here. Because of its recent strike, Fisher Body Div. of GM isn't offering bundles this month. Its production during October will apply against its unfilled September orders.

• **Philadelphia**—Prices are strong, advances of $1 a ton being posted on No. 1 busheling and couplers, springs, and wheels. The largest of the two Japanese cartels has purchased about 630,000 tons of scrap for shipment over the remainder of this year—some traders say deliveries may run into early 1962. The smaller Japanese group purchased 180,000 tons a couple of weeks ago, and is reported to be negotiating for an additional 90,000 tons.

• **New York** — Brokers' buying prices are steady with one exception: An increase in 18-8 sheets, clips, and solids to $160-$165. Strength in the major open hearth grades is sustained by Japanese purchases amounting to 630,000 tons for shipment over the remainder of this year.

• **Cleveland** — Brokers are buying dealer scrap more actively than they were. They need metal for September commitments since auto scrap generation last month fell short of expectations. It's expected that the flow of auto scrap this month will be fairly heavy. Bids on the October auto lists are expected to be a little higher despite rising consumer resistance to rising prices, evidenced by increasing use of blast furnace hot metal.

• **Pittsburgh**—The market is firm but inactive. Stainless scrap prices are higher on appraisal despite reports that a major consumer is trying to reduce its inventory of 18-8 bundles and solids. With district steelmaking at the highest level since May, 1960, sellers expect a gradually rising market.

• **St. Louis**—The local scrap market has slowed down after a recent spurt in railroad material. Some brokers anticipate a price drop of $1-$2 a ton over the next 30 days.

• **Buffalo**—Sales of cast iron scrap were made to area foundries last week at prevailing price levels, based on $38 for the cupola grade.

• **Detroit**—The local market is unchanged. But there has been some activity in machine shop turnings and No. 1 heavy melting for export to Europe. Dealers and brokers think prices on auto lists will hold steady.

• **Cincinnati**—The market tone is weaker. The rising price trend appears to have been stalled for the present. Dealers say a large area consumer may not enter the market for October delivery tonnage, the third month that the mill has no purchase program for dealers.

• **Birmingham**—Despite unchanged prices, the tone of the market is firmer, particularly with respect to the electric furnace grades.

• **Houston** — The Lone Star mill raised its buying prices $1-$3 a ton on a new order for tonnage to be delivered through October. Houston prices, based on scattered export buys and privately negotiated mill purchases, are unchanged with the exception of crushed turnings, which rose $2 a ton. Broker buying prices based on the East Texas mill's order are: No. 1 heavy melting $37.50, No. 2 heavy melting $35, No. 2 bundles $26, crushed turnings $19, and cupola cast $39.

• **Seattle**—Prices are holding at the levels established a week ago. Demand is fairly active on domestic account, and substantial support is coming from the exporters. Some export material is in short supply, and shippers are pressing for tonnage throughout the area.

• **Los Angeles**—Weakness is developing in the local market, and prices are expected to slip $2-$3 a ton this month. Japanese needs appear to be filled, and domestic demand is not strong enough to provide needed price support.

Pig Iron . . .

Pig Iron Prices, Page 89

Demand for iron from foundries and steelmakers has improved moderately. Producers are lighting furnaces. Bethlehem Steel Co. blew in a sixth unit at the Lackawanna, N. Y., plant, reflecting rising demand for hot metal to feed the mill's open hearths.

The Houston Works of Sheffield Div., Armco Steel Corp., has resumed normal operations after losing some production time to Hurri-

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Sept. 27, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 27	$39.83
Sept. 20	39.83
Aug. Avg.	38.33
Sept. 1960	32.00
Sept. 1956	59.08

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	38.00-39.00
No. 2 bundles	27.00-28.00
No. 1 busheling	37.00-38.00
No. 1 factory bundles	47.00-48.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	43.00-44.00
3 ft and under	40.00-41.00
Heavy turnings	29.00-30.00
Punchings & plate scrap	45.00-46.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	47.00-48.00§

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Random rails	*46.00-47.00*
Angles, splice bars	45.00-46.00
Railroad specialties	48.00-49.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	*190.00-195.00*
18-8 turnings	*115.00-120.00*
430 bundles & solids	*90.00-95.00*
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	41.00-43.00
No. 1 hvy melt., dealer	40.00-41.00
No. 2 hvy melting	36.00-37.00
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	25.00-26.00
No. 1 busheling, indus.	41.00-43.00
No. 1 busheling, dealer	40.00-41.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	21.00-22.00
Shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals, 3 ft	47.00-48.00
Punchings & plate scrap	49.00-50.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	39.00-40.00
Unstripped motor blocks	35.00-36.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. malleable	49.00-50.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Angles, splice bars	47.00-48.00
Axles	58.00-59.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles, solids	190.00-195.00
18-8 turnings	110.00-115.00
430 bundles & solids	95.00-100.00
430 turnings	55.00-60.00

BUFFALO

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	32.00-33.00
No. 2 bundles	24.00-25.00
No. 1 busheling	32.00-33.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	40.00-41.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	43.00-44.00
Rails, 3 ft and under	49.00-50.00
Railroad specialties	42.00-43.00
Rails, rerolling	64.00-65.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	42.00-43.00
No. 1 bundles	38.00-39.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	38.00-39.00
Machine shop turnings	15.00-16.00
Shovel turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut foundry steel	36.00-37.00
Cut structurals, plate 2 ft and under	43.00-44.00
Low phos. punchings & plate	39.00-40.00
Alloy free, short shovel turnings	20.00-21.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	44.00-45.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	50.00-51.00
Rails, 2 ft and under	50.00-51.00
Rails, random lengths	47.00-48.00
Rails, 18 in. and under	52.00-53.00
Cast steel	43.00-44.00
No. 1 railroad cast	49.00-50.00
Railroad specialties	46.00-47.00
Ang'es, splice bars	46.00-47.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	165.00-170.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	42.00-43.00
No. 1 bundles	42.00-43.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	17.00-18.00
Shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	43.00-44.00
Electric furnace bundles	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling	35.00-36.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	12.00-13.00
Shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos., 18 in.	40.00-41.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	30.00-31.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 18 in. and under	48.00-49.00
Rails, random lengths	42.00-43.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Mixed cast	31.00-32.00
Stove plate	28.00-29.00
Heavy breakable	27.00-28.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00

PHILADELPHIA

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	43.00-44.00
No. 2 bundles	26.00-27.00
No. 1 busheling	*44.00*
Electric furnace bundles	45.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	45.00-46.00
Couplers, springs, wheels	*44.00-46.00*
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	42.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	32.00-33.00

Stainless Steel

18-8 sheets, clips, solids	*160.00-165.00*
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop trunings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	31.00
No. 1 bundles	36.00
No. 2 bundles	*25.00*
No. 1 busheling	36.00
Machine shop turnings	16.50
Shovel turnings	18.50

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	35.00
Stove plate	*37.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00*
Rails, random lengths	*43.00*
Rails, rerolling	*55.00*
Rails, 18 in. and under	46.00
Railroad specialties	44.00
Angles, splice bars	40.00†

BIRMINGHAM

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	39.00-40.00
No. 2 bundles	22.00-23.00
No. 1 busheling	40.00-41.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	44.00-45.00
Structurals & plate	44.00-45.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	38.00-39.00
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R. R. heavy melt.	39.00-40.00
Rails, rerolling	51.00-52.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	42.00-43.00
Angles, splice bars	43.00-44.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
Machine shop turnings	12.50-13.00
Crushed turnings	*19.00*
Low phos. plate & structurals:	
3 ft	41.00-42.00
2 ft and under	47.00-48.00

Cast Iron Grades

No. 1 cupola	41.50-42.50
Heavy breakable	25.00-26.00
Foundry malleable	29.00-30.00
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	40.00-41.00

LOS ANGELES

No. 1 heavy melting	43.00-45.00
No. 2 heavy melting	41.00-42.00
No. 1 bundles	42.00
No. 2 bundles	30.00
No. 2 bundles (export)	31.00
Machine shop turnings	20.00
Shovel turnings	20.00
Cast iron borings	17.00-18.00
Electric furnace scrap	50.00-52.00

Cast Iron Grades

No. 1 cupola	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-45.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	49.00
No. 2 heavy melting	45.00
No. 2 bundles	35.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	49.00
No. 1 hvy (unprepared)	44.00
No. 2 heavy melting	45.00
No. 2 hvy (unprepared)	40.00
No. 2 bundles	35.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	38.00
Stove plate (f.o.b. plant)	36.00
Unstripped motor blocks	37.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	29.00**
Machine shop turnings	16.00-18.00
Mixed borings, turnings	16.00-18.00
Cast iron borings	16.00-18.00
Heavy turnings	16.00-18.00
Shovel turnings	16.00-18.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	30.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	30.00
Unprepared	24.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

cane Carla. The blast furnace was out of action for ten days.

Woodward Iron Co., Woodward, Ala., has put a third blast furnace into production.

Youngstown Sheet & Tube Co. purchased the Anna blast furnace at Struthers, Ohio, from Pittsburgh Coke & Chemical Co. The transaction includes a 32 acre site between the firm's Campbell Works and the Struthers plant. The annual capacity of the furnace is 182,500 tons. It has been out of blast since 1953.

Blast Furnace Production Increased During August

Blast furnace production (pig iron and ferroalloys) in August totaled 5,813,285 net tons, up 166,154 from the 5,647,131 produced in July, and 1,316,177 above the 4,497,108 produced in August, 1960, reports the American Iron & Steel Institute.

Production in the first eight months this year totaled 40,197,696 tons (including 329,926 tons of ferroalloys). That compares with 50,594,828 tons (480,147 tons of ferroalloys) in the like period last year.

Data by states for August and the first eight months:

Blast Furnace Production

(Net tons)

States	August, 1961	First Eight Months 1961	1960
New York, Massachusetts ..	361,771	2,253,774	3,247,413
Pennsylvania .	1,343,826	9,439,926	13,021,872
Md., Va., W. Va. ...	586,297	3,889,959	4,769,517
Ky., Tenn., Tex.	149,461	1,028,289	1,247,549
Alabama ...	328,956	2,306,110	2,614,721
Ohio	982,743	6,753,864	9,163,644
Indiana	788,617	5,637,900	6,226,557
Illinois	432,897	2,960,065	4,043,883
Mich., Minn..	450,485	2,992,435	3,629,075
Colo., Utah, Calif.	388,232	2,935,374	2,630,597
Totals	*5,813,285	†40,197,696	‡50,594,828

*Includes 49,113 tons of ferromanganese and spiegeleisen.
†Includes 329,926 tons of ferromanganese and spiegeleisen.
‡Includes 480,147 tons of ferromanganese and spiegeleisen.
Data from American Iron & Steel Institute.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 85 & 86

Sheet steel is moving more actively. Demand lagged noticeably throughout September. Improvement is attributed to better buying by the automotive industry, and also to stronger demand from household appliance firms, makers of containers, office furniture and some building products. Strapping and certain forms of piping are also more active.

Little buying by consumers for stock is noted, and mill delivery promises on the major tonnage items (hot and cold rolled sheet) remain easy. Hot sheets can be had within three weeks and cold rolled in three to five. Galvanized sheet deliveries are available in four to five weeks, but some producers are sold up through November.

Plates . . .

Plate Prices, Page 84

While demand for plates has leveled off, the over-all trend continues upward. Specifications from tank and boiler makers are substantial, and shipwork is picking up. Pipe requirements are running ahead of those a month ago at some points, though pipeline needs have dried up in the Midwest, and prospects for an early revival in demand there are not promising.

Sun Shipbuilding & Dry Dock Co., Chester, Pa., booked four fabricated hull sections for the Portsmouth (N. H.) Navy Yard. The Navy's Bureau of Ships closes about Oct. 15 on two, 275 ft, patrol escort ships. Todd Shipyard Corp. has a contract for two, 210 ft, patrol craft for the Coast Guard.

Freight Car Orders Slip, Deliveries Rise in August

Domestic freight car orders in August declined to 1474 units from 2452 in July, reports the American Railway Car Institute and the Association of American Railroads. The lines ordered 1343 cars in August, 1960.

Deliveries of completed units in August amounted to 2428 vs. 1229 in July and 4124 in August last year. Of the total August deliveries, 1701 units were produced in commercial shops and 727 in railroad car shops.

Order backlogs as of Sept. 1 showed 5115 cars on order in railroad shops and 4575 in commercial shops, a total of 9690. That com-

(*Please turn to Page* 100)

Steel Shipments by Markets—July, 1961

(Net tons)

Markets	July, 1961	First Seven Months 1961	1960
Converting-Processing	177,704	1,334,244	1,986,670
Forgings (except auto)	50,323	410,762	578,272
Fasteners	70,046	506,829	721,142
Distributors:			
Oil & Gas Industry	142,979	835,558	735,210
All Other	880,872	5,971,927	7,815,187
Total Distributors	1,023,851	6,807,485	8,550,397
Construction:			
Oil & Gas	173,054	1,185,921	1,442,516
All Other	605,547	4,002,742	4,863,337
Total Construction	778,601	5,188,663	6,305,853
Contractors' Products	345,724	2,155,659	2,434,120
Automotive:			
Vehicle, Parts, etc.	813,746	6,179,757	9,132,462
Forgings	35,223	230,984	286,700
Total Automotive	848,969	6,410,741	9,419,162
Rail Transportation:			
Rail, Track, Equipment	32,757	289,778	602,838
Cars & Locomotives	81,515	556,833	1,301,122
Transit Systems	1,349	16,547	23,173
Total Rail Transportation	115,621	863,158	1,927,133
Shipbuilding	50,952	347,071	380,743
Aircraft	4,982	41,283	50,387
Oil & Gas Drilling	23,610	206,562	291,645
Mining, Quarry, Lumbering	19,188	153,534	183,406
Agricultural:			
Machinery	42,411	397,557	501,872
All Other	36,799	200,185	158,964
Total Agricultural	79,210	597,742	660,836
Machinery, Equipment, etc.	272,867	2,055,739	2,755,503
Elec. Machinery, etc.	143,478	1,096,865	1,332,037
Appliances, etc.	124,798	952,622	1,231,411
Other Domestic Uses	130,750	977,000	1,298,702
Containers:			
Cans & Closures	478,273	3,396,699	3,446,471
Barrels, Drums, Pails	65,851	446,016	556,921
All Other	38,282	255,633	419,871
Total Containers	582,406	4,098,348	4,423,263
Ordnance, Military	10,861	80,831	94,469
Exports	110,572	881,992	1,662,507
Nonclassified	156,295	1,187,764	1,282,294
Total Shipments	5,120,808	36,354,874	47,569,952

Data from the American Iron Ore Association.

Aluminum Price Drop Stuns Metalmen

Nonferrous Metal Prices, Pages 98 & 99

THE 2-CENT-a-pound drop in aluminum ingot prices Sept. 25 may take top honors as the most surprising 1961 development in metals.

U. S. primary producers now quote 24 cents a pound for ingot, the lowest price since 1958. Billet prices are down 1.7 cents a pound. At the same time, prices of mill products were reduced as much as 2 cents a pound. Casting grade alloys were cut between 0.7 and 0.9 cent a pound; sheet and plate, 1 cent; round tube, 1 to 2 cents; tubular products in two alloys and extruded shapes, bar, and rod down 2 cents a pound.

• **Higher Prices Expected**—A short time ago, all indicators pointed toward a higher aluminum price. The industry made no secret of its feelings that increased prices were justified to compensate for increased labor and other costs. In August, some minor hikes on mill prices were posted. At the same time, some metal quotations were pared to better reflect prices being paid.

But the economic signposts seemed to point toward more hikes before the year is out. The key, said the forecasters, was how well aluminum sales went.

Sales have been picking up steadily. Price cutting has eased a bit. Fourth quarter business is expected to be so strong that 1961 will top 1960 about 4 per cent. That would mean shipments of around 2,450,000 tons, close to the record 2,480,000 tons of 1959.

• **What Happened**—The stage was set for a cut with the devaluation of Canadian currency. The price of ingot in Canada remained at 23.25 cents a pound. But the U. S. dollar became worth more than its Canadian counterpart. It now takes only 22.55 cents a pound (in U. S. currency) to equal the Canadian price.

Aluminium Ltd. Sales Inc., U. S. sales subsidiary of Aluminium Ltd., announced that if buyers so desired, they could take delivery of ingot at the U. S.-Canadian border for 22.55 cents a pound (in U. S. dollars). Even allowing for the 1.25 cent import duty and freight costs, this meant customers could buy ingot at 1.5 to 2 cents a pound less than the going U. S. price. To stay competitive, U. S. producers dropped their price 2 cents.

Lead-Zinc Bill Up to JFK

In an eleventh hour move, the Senate rescued the small producer, lead-zinc subsidy bill. Though passed by the House, the bill seemed doomed in the Senate where it was tacked onto a far reaching, lead-zinc, tariff-subsidy measure which was bottled up in committee. At the last minute, the bill was divorced from the broader measure, passed, and sent to Mr. Kennedy.

Diecasters See '62 Gains

If business forecasts hold up, "1962 will see the production of aluminum diecastings at a record high level, and zinc diecasting output will approach the 350,000 ton level which is normal for a year of high automotive output," says the American Die Casting Institute Inc. (ADCI).

Shipments were down in the first half. Since then, improvement has been slow but steady. Forecasts ADCI: Aluminum diecasting production for 1961 may top the 1960 total of 182,750 tons. Zinc diecasting production will fall about 10 per cent short of the 1960 level of 312,500 tons. Magnesium and brass diecasting production should gain. Probable 1961 diecasting total: Only slightly under that of 1960.

Lightweight Aluminum Tapered Plate Use Grows

The market for lightweight aluminum tapered plates as a standard construction material for large diameter storage tanks is growing, reports L. S. Beeler, chemical industries market manager, Reynolds Metals Co., Richmond, Va. Since introduction six months ago, Reynolds has sold more than a half million pounds of tapered aluminum plates. It's estimated that by 1965 the chemical and hydrocarbon processing industries will require a minimum of 7 million lb annually.

Tapered panels form thick walls at the tank's bottom and progressively thinner walls at the top.

A 4.5 million gallon tank requiring 250,000 lb of tapered plates is under construction for Cooperative Farmers Chemical Association, Lawrence, Kans. It's the second ordered by the association. Both are for ammonium nitrate solution storage.

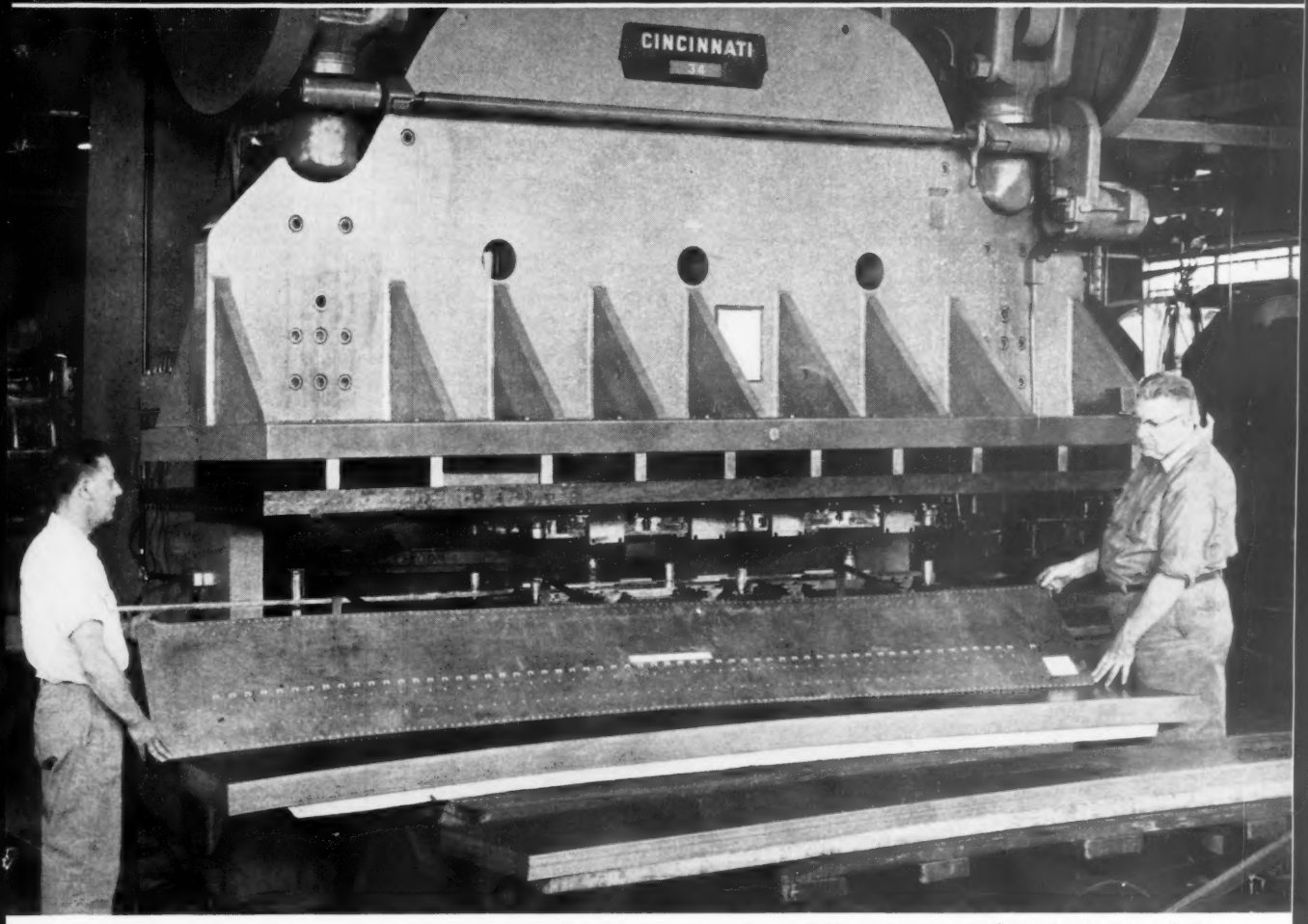
Nonferrous Foundrymen See Upturn

SHIPMENTS of nonferrous castings (copper-base, aluminum, magnesium) may increase up to 30 per cent over the next six months. That's the opinion of foundrymen polled at the recent annual meeting of the Non-Ferrous Founders' Society.

Sixty per cent of the brass and bronze foundrymen see sales increasing 5 to 30 per cent over the next half year; 30 per cent think business will remain about the same as it is now; and 10 per cent see a downturn. Aluminum casting sales will also rise 5 to 30 per cent, say 40 per cent; 35 per cent see a plateau; 25 per cent see a slump.

• **Mixed Year**—Sales so far in 1961 present a mixed picture. One-third

CINCINNATI® PRESS BRAKE
cuts press work costs



Courtesy Dahlstrom Manufacturing Corporation, Jamestown, N. Y.

For half the initial cost of a conventional press with equal die area and tonnage, the Dahlstrom Manufacturing Corporation does its press work on a Cincinnati Press Brake with widened bed and ram.

Its low first cost has been followed by other savings, too. For example, setup and operation are easy and fast because the die area is out in front of the housings. Floor-to-floor time per piece is half what it was with previous production methods. Cincinnati accuracy holds .005″ tolerances between holes.

Dahlstrom uses the full versatility of the Cincinnati Press Brake for shallow draw work, blanking, notching, and punching. Ask our representative to show you how to earn similar savings in your shop.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 24.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $40 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75.

Germanium: Purified, Ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pig, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 122.25.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max), $1.37 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7.25-7.75 per lb; 100-500 lb, $6.75-7.25 per lb; 500-1000 lb, $6.25-6.75; over 1000 lb, $6.25 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00; No. 12 foundry alloy (No. 2 grade), 21.25; 5% silicon alloy, 0.60 Cu max, 23.00; 13 alloy, 0.60 Cu max, 23.00; 195 alloy, 24.25; 108 alloy, 21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.50.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa., rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and omer, f.o.b. mill.) Sheets and strip, $5.70-15.50; sheared mill plate, $4.45-9.00; wire, $5.00-9.50; forging billets, $3.00-4.75; hot-rolled and forged bars, $3.39-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $11.00-16.00; H.R. strip, $11.00-15.00; C.R. strip, $13.00-18.00; forged or H.R. bars, $11.00-15.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.183	24-72	72-180	45.40-48.00
0.183-0.154	24-72	72-180	45.40-48.00
0.154-0.120	24-72	72-180	45.90-48.80
0.120-0.096	24-72	72-180	45.90-48.80
0.096-0.076	24-72	72-180	46.40-50.30
0.076-0.060	24-72	72-180	46.90-51.10
0.060-0.047	24-72	72-180	47.40-52.30
0.047-0.037	24-72	72-180	47.90-53.70
0.037-0.030	24-72	72-180	48.40-55.30
0.030-0.023	24-60	72-180	48.90-57.10
0.023-0.018	24-48	72-144	49.40-57.40
0.018-0.014	24-48	72-144	51.20-58.00
0.014-0.011	24-48	72-144	53.50-60.00
0.011-0.0085	24-36	72-96	56.20
0.0085-0.007	24-36	72-96	59.20
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates: 1100, 3003, and 5005, mill finish, 0, H12, and H14 tempers, 30,000 lb base f.o.b. customer custody.

Thickness (in.)	Width (in.)	Length Range (in.)	Price Range
3.000-2.000	6-144	72-240	46.10-51.00
2.000-1.251	6-144	72-240	46.50-51.30
1.251-0.751	6-144	72-240	45.50-50.60
0.751-0.250	6-144	72-240	45.50-50.60

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Rounds, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. width; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	(AZ31C) Com. Grade	(AZ31B) Spec. Grades
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.00-24.50; No. 2 heavy copper and wire, 22.00-22.50; light copper, 19.25-19.75; No. 1 composition red brass, 21.50-22.00; No. 1

BRASS MILL PRICES

(Copper or Copper Alloy No.)	MILL PRODUCTS a Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES d (Based on copper at 31.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper (110)	56.13b	50.36-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass (268, 270)	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80% (240)	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85% (230)	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90% (220)	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze (675)	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal (365)	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass (464)	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze (651)	61.39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10% (745)	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5% (510)	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 20.50-21.00; new brass clippings, 17.50-18.00; light brass, 14.50-15.00; heavy yellow brass, 15.50-16.00; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 18.00-18.50; cocks and faucets, 18.00-18.50; brass pipe, 18.00-18.50.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-35.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 6.00-6.50; segregated low copper clips, 13.50-14.00; segregated high copper clips, 12.00-12.50; mixed low copper clips, 11.50-12.00; mixed high copper clips, 11.00-11.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 9.75; clean borings and turnings, 8.50; segregated low copper clips, 13.00; segregated high copper clips, 12.25; mixed low copper clips, 12.25; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.50; light copper, 23.25; refinery brass (60% copper) dry copper content, 24.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50, No. 2 heavy copper and wire, 25.50; light copper, 23.25; No. 1 composition borings, 24.00; No. 1 composition solids, 24.50; heavy yellow brass solids, 18.50; yellow brass turnings, 17.50; radiators, 20.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 196.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 141.50; 200-499 lb, 140.00; 500-999 lb, 139.50; 1000 lb or more, 139.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.85, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 89.60; 100-600 lb, 79.90; 700-1900 lb, 77.20; 2000-9990 lb, 75.30; 10,000 lb or more, 74.00.

Stannous Chloride (Anhydrous): 100 lb, 149.00; 400 lb, 139.00; 800-19,000 lb, 117.70; 20,000 lb or more, 113.50.

Stannous Sulphate: Less than 50 lb, 156.30; 50 lb, 126 30; 100-1900 lb, 124.30; 2000 lb or more, 122.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

of the brass and bronze foundrymen say business is 5 to 20 per cent better; another third are down a like amount; and the remainder are about even with the 1960 pace. The same pattern holds in aluminum.

Customers are cost conscious and show a greater concern for quality. Price fighting has not increased much, but it has not slowed down much either.

• **Need Statistics**—One of the biggest problems facing the industry is the lack of end use information. Another is the unavailability of current data on production, shipments, and new orders.

CLASSIFIED ADVERTISING

WANTED: ANNEALING FURNACE

Continuous roller type with cooling zone and cooling tower. Maximum heat 1850 degrees; radiant tube fired. Complete with all necessary instruments and controls.

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MOTORS • GENERATORS • TRANSFORMERS
ELECTRIC EQUIPMENT CO.
World's Largest Inventory
Call collect: CL 4-9058
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Representatives Wanted

MANUFACTURER'S AGENT WANTED
For areas of Chicago, Cleveland, Pittsburgh and Detroit. Heat Exchangers (recuperators, air heaters, etc.) for steel industry, foundries and others, by well established Pittsburgh Company. Applications only from experienced companies with background in industrial heating and excellent contacts in respective industries in their areas. Product sales prices range between $10.000.00 and $100 000.00 and higher. Reply Box 956, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

Experienced Executive. Experienced in all phases of steel and plate fabrication including estimating, sales and general management. Available because of merger. Desires position as President or Vice President. Reply Box 965, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

WANTED — ASSISTANT SUPERINTENDENT blast furnace operation. Young well established completely integrated steel company located in great southwest area needs to fill key position in its blast furnace department with well qualified man age limit 45 years. Company currently engaged in multi-million dollar expansion program. Excellent opportunity. Submit complete resume giving personal history, education, experience and salary requirements. All replies held confidential. Box 961, STEEL, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST—Graduate, age 28-40 for steel manufacturer. Prefer experience in stainless or alloy steel production. Plant located Middle Atlantic area. In resume furnish education, complete work history, salary expected. Equal opportunities employer. Write Box 966, STEEL, Penton Bldg., Cleveland 13, Ohio.

Accounts Wanted

ACCOUNT WANTED
FORMER PRESIDENT of heavy equipment manufacturer and general manager of one of its divisions wants to represent maker of heavy castings or machinery. Pittsburgh and Eastern Ohio preferred. Wide sales acquaintance throughout steel industry. Semiretired and healthy but bored. Write Box 963, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

ENGINEERS

Immediate openings for qualified applicants familiar with chemical cleaning of process equipment or municipal/industrial water and waste treatment. Specific opportunities for:

SERVICE & SALES ENGINEERS

Degree in chemical or mechanical engineering. Prefer steel-mill or powerplant experience in high-pressure boilers and related equipment; furnace and rolling-mill operation.

Management recognition of initiative and ingenuity, unlimited opportunity for advancement. Group life insurance plus extensive major medical coverage. Unique retirement benefits. Applicant must be willing to relocate and travel. Openings available nationwide. Individual preference for area assignments, if possible. Diversification of work assures full utilization of talent.

Mail resume to:
PERSONNEL MANAGER
DOW INDUSTRIAL SERVICE
DIVISION OF
THE DOW CHEMICAL COMPANY
20575 Center Ridge Road
Cleveland 16, Ohio

This worker at the Coatesville, Pa. plant of Lukens Steel Company is using a Pannier Marker equipped with the newly-designed magazine-style marking head to stamp hot slabs with an identifying number.

Hot Steel Marking by controlled impact

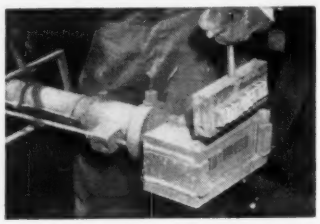
Uniformly clear stamping of heat or ingot numbers on billets or slabs, or serial or part numbers on hot forgings is provided by Pannier Single Stroke Pneumatic Markers.

The operation is positive, fast and automatic. The worker, standing comfortably back from the heat, is able to position the marking head accurately against the steel. The hammer first aligns itself, trips itself and makes the impact automatically.

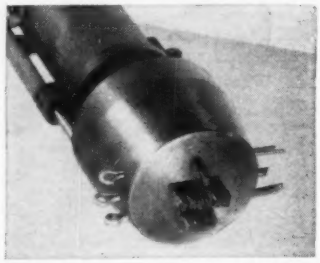
The new head shown here incorporates a fast-change typeholder that permits users to change entire type set-ups quickly, easily and safely. Pre-set type is now economically possible. In just a few seconds, a spare type magazine with an all-new type set-up can be inserted into the marking head. Pre-setting type prevents costly down-time for changes.

The type magazine is made to accommodate lines of interchangeable characters positioned to your specifications. The type is held secure in the magazine by Pannier's sure-safe locks...spilling danger is eliminated.

Pannier engineers will be glad to consult with you on hot steel marking. For complete information, write



This fast-change stamping head shown in operation above uses a type magazine. By the use of spare magazines for type changes, a new set of numbers can be dropped in place in seconds.



Hardened type is easily released for change in this style Pannier marker head by sliding out the pins. This head is effective where numbers are repeated on several pieces.

Pannier markers are now available for automated operation for larger billets and slabs. This numbering head contains a series of number wheels, rotated and set by push button, tape or card control. The entire marking operation can be completed by programmed remote control.

MASTER PANNIER MARKERS

PANNIER MASTER MARKERS
390 Pannier Building, Pittsburgh 12, Pa.

(*Concluded from Page 95*)

pares with 10,644 on Aug. 1, and 23,866 on Sept. 1, 1960.

Included in the 9690 cars undelivered as of Sept. 1 were 3914 boxcars, 1513 refrigerator cars, and 1561 flatcars.

Wire . . .

Wire Prices, Pages 86 & 87

Some sellers of wire rods think October volume will be the best so far this year. Among those specifying freely are chain manufacturers.

Business in manufacturers' wire is also up, due in part to renewed automotive buying. In New England, consumer buying of industrial grades has not been sufficiently heavy to carry their operations through the fourth quarter, and supplemental orders are being placed.

The Navy has taken bids on 19,100 spools of small size stainless, Grade 316, for delivery to Norfolk, Va. The U. S. Engineer, Memphis, Tenn., closes Oct. 12 on noncorrosive wire, including squares of fabric, side twist wires, and end twist wires.

Furniture wire and automotive business (springs for seats) are moving at a good clip.

Structural Shapes . . .

Structural Shape Prices, Page 84

Public work dominates in the structural steel market. For example, the bulk of buying in New England is for wide flange beam and stringer bridges. School requirements are also at a high level.

In general, demand for structurals is mixed. In the East, tonnage continues to move well, and some shops report a tightening in backlogs. In the Midwest, however, orders are down from where they were a couple weeks ago.

Fabricated material prices are easy. However, there's some speculation in the market about a price increase at the mill level before yearend.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, Charles Street office building, Baltimore, through McCloskey & Co., Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.; 500 tons of concrete reinforcing bars were also awarded to Bethlehem.

2100 tons, bridge to carry Chicago River & Indiana Railroad tracks across South Expressway, Chicago, for State of Illinois, to

Allied Structural Steel Companies, Chicago.

515 tons, office building, State Motor Vehicle Department, Wethersfield, Conn., to Topper & Griggs (Bethlehem Fabricators Inc.), Hartford, Conn.; Southern New England Contracting Co., Hartford, Conn., general contractor; Concrete reinforcing steel went to Scherer Steel Co., East Hartford, Conn.

175 tons, shopping center on Route 130, Brooklawn, N. J., awarded through Sidney Elkman Inc., Philadelphia, general contractor, to Camden Iron Works, Camden, N. J.

105 tons, administration building, Delaware River Port Authority, Camden, N. J., to Frank M. Weaver Co., Lansdale, Pa.

STRUCTURAL STEEL PENDING

3000 tons, plant expansion, Lukens Steel Co., Coatesville, Pa.; award expected shortly through United Engineers & Constructors Inc., Philadelphia.

2000 tons, transmission towers, bids reset by Bonneville Power Administration, Portland, Oreg., Oct. 6.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2200 tons, Belevedere Avenue interchange (state), Baltimore, through J. R. Nissley Inc., Landisville, Pa., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.; 1185 tons of structurals also required.

1160 tons, hospital, Lakeville, Mass., State Department of Public Health, project H-60-3, to Northern Steel Inc., Boston; Joseph Rugo Inc., Boston, general contractor; 62 tons of structural steel went to Groisser & Shlager Iron Works, Somerville, Mass.

930 tons, Men's House of Detention, Philadelphia, through John McShain, Philadelphia, general contractor, to American Steel Engineering Co., Philadelphia.

900 tons, Southwest Freeway bridge, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

815 tons, state bridge, Cumberland County, Pennsylvania, through Reed & Kuhn, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.; 970 tons of shapes went to the Cumberland Bridge Co., New Cumberland, Pa. (noted in recent issue).

500 tons, Charles Street office building, Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.; 3500 tons of shapes also went to Bethlehem.

500 tons, municipal parking facility, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; Howard S. Wright Construction Co., Seattle, general contractor.

475 tons, Theodore Roosevelt Bridge, Philadelphia, through McCloskey & Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

420 tons, high school, Bloomsburg, Pa., through S. H. Evert Co., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

275 tons, French Slough flood control project, Snohomish County, Wash., to Joseph T. Ryerson & Son Inc., Seattle; Wayne Construction Co., Seattle, is general contractor.

160 tons, repairs to Alki seawall, Seattle, to Joseph T. Ryerson & Son Inc., Seattle; Wayne Construction Co., Seattle, general contractor.

105 tons, Metropolitan Sewage District, Seattle, to Pacific Coast Div., Seattle, Bethlehem Steel Co.; Far West Construction Co., Seattle, general contractor.

55 tons, McDonald Creek bridge, Glacier National Park, Montana, to Pacific Coast Div., Seattle, Bethlehem Steel Co.

REINFORCING BARS PENDING

1086 tons, supply office, Yards & Docks, Navy Department, Port Hueneme, Calif.; bids Oct. 12, destination Korea.

206 tons, Washington State overpass, King County; bids to Olympia, Wash., Oct. 10.

167 tons, state bridgework, Franklin County, Pennsylvania; bids Oct. 13.

150 tons, Washington State ramp and overpass, Pierce County; bids to Olympia, Wash., Oct. 10.

140 tons, Washington State approaches to Evergreen Point Floating Bridge, Seattle; bids to Olympia, Wash., Oct. 10.

55 tons, Washington State underpass, Geiger Airfield, and unstated 871 tons of steel piling, Bremerton Ferry Terminal; bids to Olympia, Wash., Oct. 10.

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WARD

For Countless Uses of

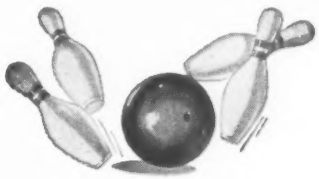
SPRING STEEL

AMERICA'S LEADING SUPPLIER

Where SERVICE and QUALITY is the rule

WARD STEEL CO.

Boston—Cambridge, Mass.
Chicago, Ill.—Greensboro, N. C.



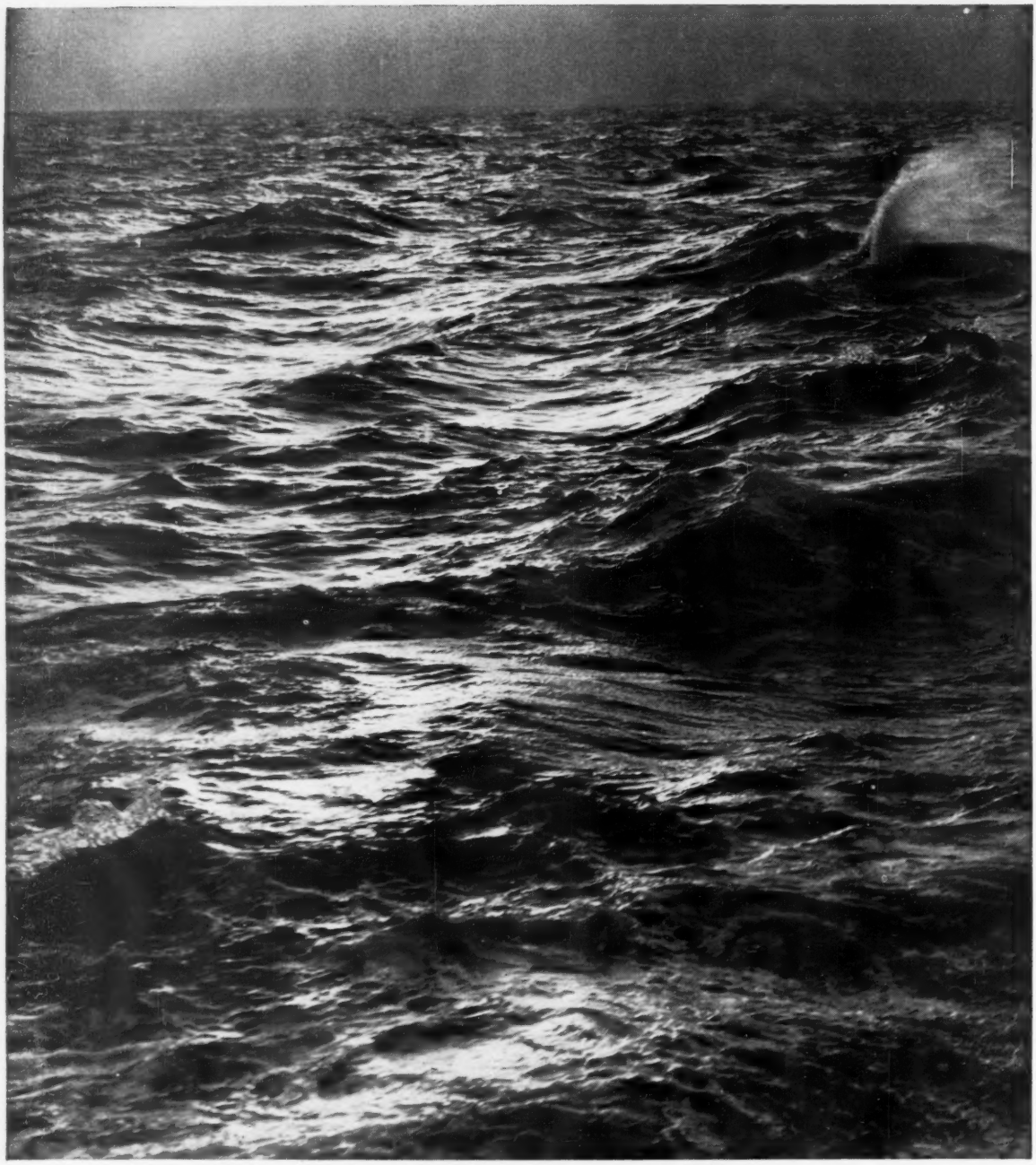
You spent $450,000,000 on bowling last year

13½ times as much as you gave to fight cancer

Shocking? Yes. And here's another shocking fact: in 1961, cancer will strike in approximately two out of three homes.

Go bowling. It's fun. Enjoy yourself. But when you spend fifty cents to knock down pins—give as much to the American Cancer Society—*to knock out cancer.*

If you do that, you will be giving $450,000,000 to fight cancer this year. *Thirteen and a half times as much as last year!* Fight cancer with a checkup—and a check to the **American Cancer Society.**



There's business out there.

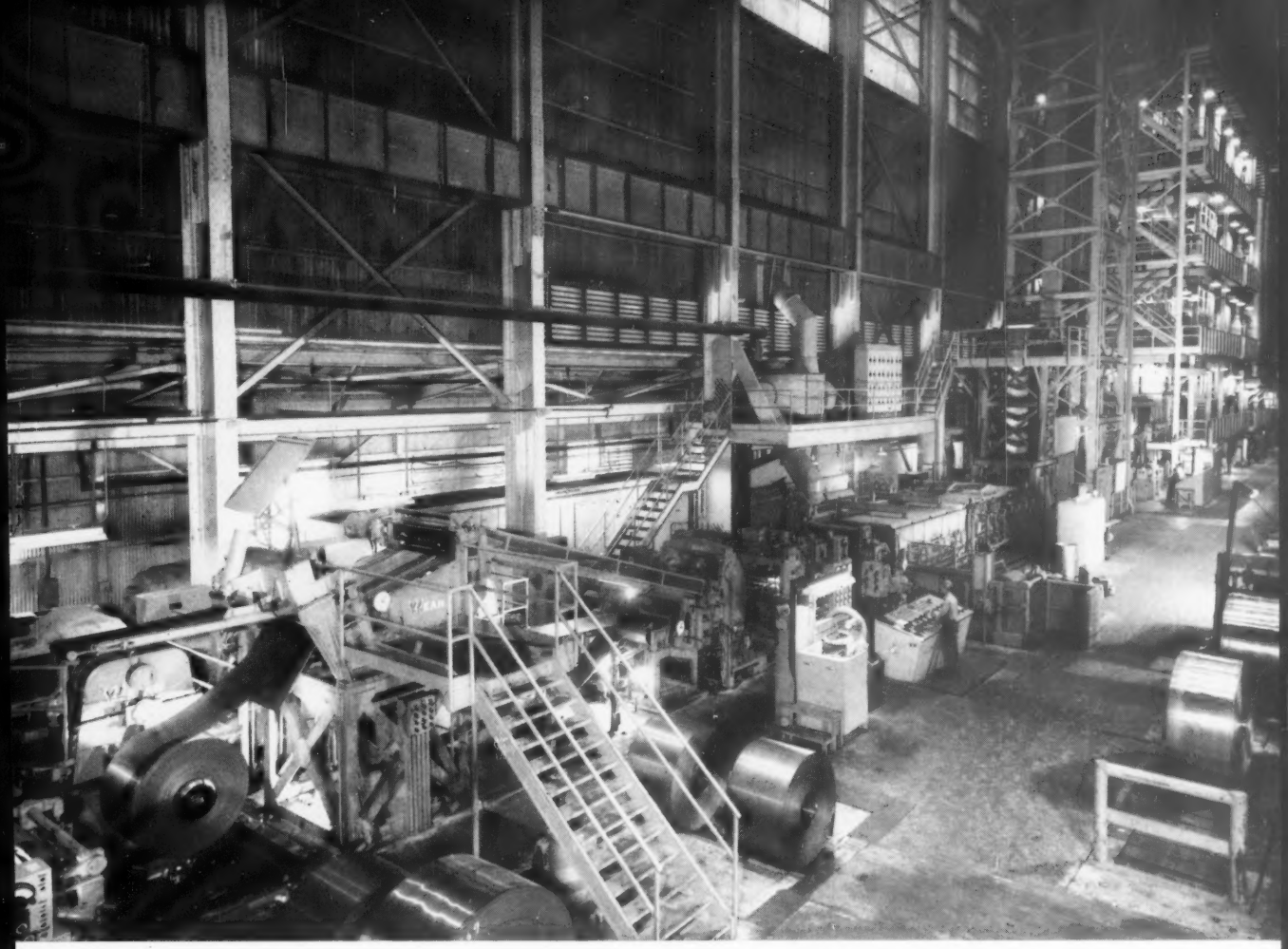
You're looking at more than a horizon. It's a future, yours and America's. Out there is Europe and Latin America and Asia and Africa. But in 1960, of all U.S. manufacturers, less than 5% saw these foreign shores for what they are worth: a 19-billion-dollar export market, a vast source of foreign trade.

Move in for your share. Build your business and help keep America growing. Extra production creates more jobs, helps balance the outflow of gold, and wins new friends abroad with U.S.-made products.

Even if you've never sold overseas, you have a rare opportunity to start—now. Your U.S. Department of Commerce will help with counsel by experts on what, where and how to sell—with data on credits, payments and financing. A package of invaluable know-how is yours for the asking.

Now's the time to discover the many ways in which your business can grow. In the lucrative export markets. In new U.S. markets. In developing new products. In attracting new industry to your community. Just write or phone the U.S. Department of Commerce Office of Field Services in your city, or Washington 25, D.C. They are ready to help you grow with America!

NOW'S THE TIME TO GET GROWING IN A GROWING AMERICA!



J&L adds modern Wean Annealing Line as major part of tin plate expansion

Recently installed at Jones & Laughlin Steel Corporation's Aliquippa, Pennsylvania plant, this high-speed continuous annealing line represents a major step in J&L's tin plate expansion program. The line is designed to operate at speeds up to 2000 fpm, and it can handle coils weighing up to 50,000 lb with a maximum O.D. of 85".

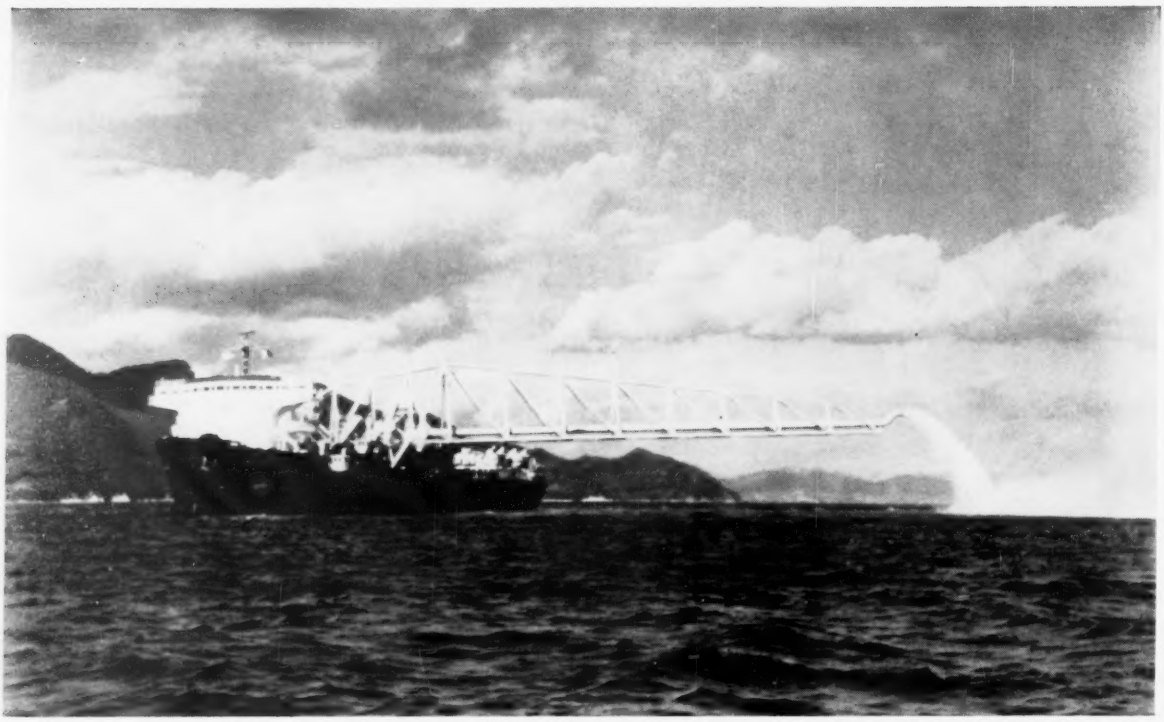
Strip tension is controlled within the major zones of the line by six precision bridles. The bridle controls are interlocked to provide optimum operating tensions in the looping towers, cleaning zone and furnace. This accurate tension control, coupled with other design features, assures positive tracking of the strip throughout the length of the line.

Off-gauge end scrap is removed at the entry end of the line by a novel system of shifting uncoilers, with a scrap reel located outside of the line. Short sections of scrap are joined by a traversing spot welder in order to build up coils, which facilitates scrap handling.

Thirty-one years of partnership with the steel industry and specialization in continuous steel processing facilities give Wean pre-eminent experience in this field. Whether your planning involves tin plate processing, galvanizing, cleaning or pickling facilities, Wean will be able to "creatively engineer" the equipment to meet your requirements.

WEAN

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

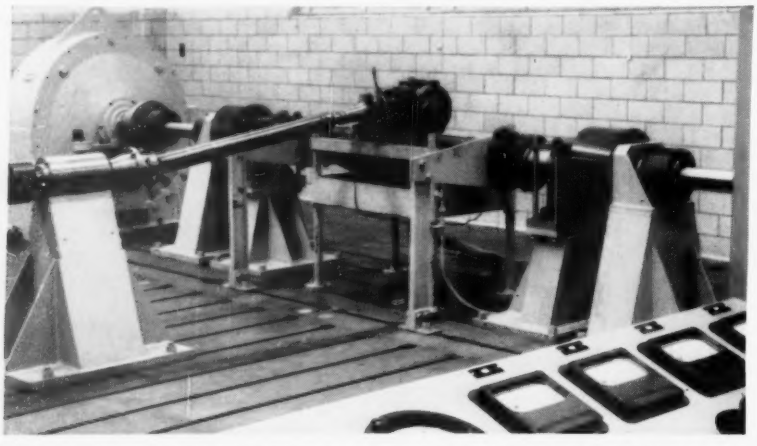


"Zulia" designed by Welding Shipyard Division of National Bulk Carriers; owned by Seadredge Company, an affiliate of National Bulk Carriers.

One Timken® bearing centers 1,000-ton boom on world's largest dredge

The channel dredge, "Zulia", mounts a whopper of a boom—1,000 tons, 437 ft. long. It pivots in a 180 degree arc. To maintain the radial position of the discharge boom and take the tremendous loads, the designers worked with Timken bearing sales engineers to select the best bearing for the job. Only one was needed, a 72" bore, 79" O.D. double-row bearing. Best of all, this is a "standard Timken" tapered roller bearing—showing the huge size range available. And Timken bearings are also used in the Cone-Drive reducer that drives the boom's rotating base.

Their tapered design lets Timken bearings take any combination of radial and thrust loads. Full-line contact between rollers and races gives *extra* load-carrying capacity. And because Timken bearings are designed to roll true, they virtually eliminate friction.



HELPING KEEP TIMKEN BEARINGS YOUR NO. 1 BEARING VALUE is this huge dynamometer in our physical laboratory. It's typical of test equipment we use to assure long life and minimum maintenance in Timken bearings.

Industry rolls on

TIMKEN®

tapered roller bearings

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.